

# THE IRON AGE

THURSDAY, JANUARY 5, 1893.

## The United States Armored Cruiser "Brooklyn."

"Under the appropriation for the "Increase of the Navy," act approved July 19, 1892, provision is made for "One armored cruiser of about 8000 tons displacement, to cost, exclusive of armament and speed premiums, not more than \$3,500,000." The principal dimensions are as follows:

Length on load line.....	400.50 feet.
Beam, extreme.....	64.88 feet.
Draft, mean, normal.....	24.00 feet.
Displacement, normal.....	9150.00 tons.
Displacement, trial.....	8150.00 tons.
Indicated horse-power.....	16000.00
Speed in knots per hour.....	20.00
Total coal capacity.....	1650.00 tons.
Coal carried on normal displacement.....	900.00 tons.

This vessel will have twin screws. The engines to be of the vertical, triple-expansion type, four in number, two on each shaft, and in four compartments. The

and abaft the machinery and boilers, to stem and to stern, the deck is to be at the thinnest part at least 2 inches and a half in thickness.

Below this deck are to be placed the propelling machinery, steering gear, magazines, shell rooms and all that is ordinarily called "the vitals of a warship."

Protection of the hull from injury to the water line region is to be afforded by means of an armor belt 8 inches in thickness extending the length of the machinery and boiler space, and in depth from 4 feet above the 24 foot water line to 4 feet 3 inches below that line.

Within this armor belt and skin plating, and above the armor of this belt, a band about 3½ feet wide of cellulose is to extend the whole length of the vessel, in depth from the armor deck to the berth deck.

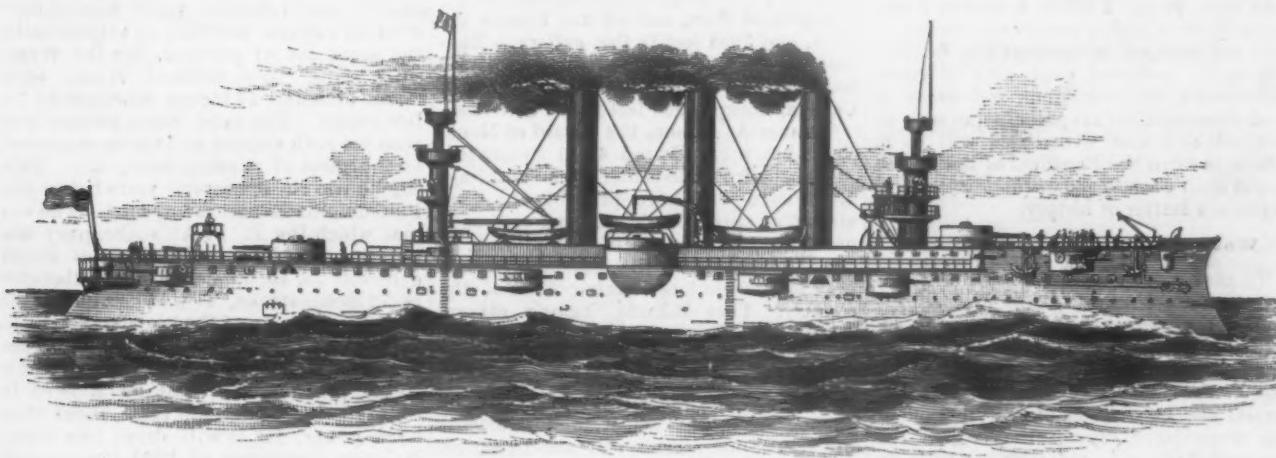
It is intended to carry coal above the armor deck for a length corresponding to the inner bottom. This space between the armor deck and the deck above is to be

barbettes, which will protect the carriages, platforms and turret machinery, to be 8 inches in thickness for a portion at least equivalent to the train of the guns of the respective turrets; the remaining portions may be reduced to 4 inches in thickness. Under the turrets there will be placed 3-inch armor supporting tubes, which will also protect the ammunition hoist.

The armor of the turrets to be 5½ inches in thickness and the guns so mounted that they can be supplied with ammunition and loaded in any position of train. The 5-inch guns are to be protected by fixed segmental shields 4 inches in thickness. The crews of these guns are to be further protected from explosive shells by splinter bulkheads 1½ inches in thickness.

Protection to be afforded the smaller guns by shields and extra side plating.

The torpedo outfit to consist of five torpedo tubes, one in the bow and two on each side, six torpedoes and a suitable allowance of gun-cotton for mines and



THE UNITED STATES ARMORED CRUISER "BROOKLYN."

forward engines to be readily uncoupled from the after engines for cruising at low speed. The boilers are placed in three compartments and are seven in number, five of them being double-ended and two single-ended.

The hull is to be of steel, not sheathed, with double bottom and close water-tight subdivision to about 12 feet above the water line.

The arrangement of decks above water to provide ample freeboard and berthing accommodations.

It is contemplated to fit two military masts with fighting tops to carry no sail. The boats will be stowed clear of the blast of the guns, but two life boats must be so carried that they may be readily lowered under all conditions of weather.

Protection of the hull is to be afforded by means of a steel protective deck worked from stem to stern and supported by heavy beams. The bottom edges of this deck, amidships, are to be 5 feet 6 inches below the 24-foot water line; the top of the deck rising to this water line at the center of the vessel.

On the slopes of the deck, over machinery and boilers, the armor is to be 6 inches thick; on the horizontal portions the armor is to be 3 inches thick; forward

subdivided by water-tight bulkheads into at least 36 coal bunkers, exclusive of the coffer dam and passages. The space forward and abaft these bunkers to be well subdivided by water-tight bulkheads for stores, &c.

A conning tower of not less than 7½ inches in thickness to be carried in a suitable commanding position, having a tube to the protective deck of not less than 5 inches in thickness for the protection of speaking tubes, bell wires, &c.

The battery of the vessel is to be:

- 8 8-inch B. L. R. of 35 calibers.
- 12 5 inch B. L. R. rapid-fire guns.
- 12 6-pounder rapid-fire guns.
- 4 1-pounder rapid-fire guns.
- 4 machine guns.
- 2 field guns.

The 8-inch guns will be mounted in four barbette turrets, placed one forward and one aft on center line of vessel, and one on either side of the vessel amidships. The guns in the turrets on the center line of the ship are to have a train of 310°; those in the side turrets to fire from right ahead to right astern, or to train through an arc of 160° each. The center of side turrets to be distant from the center line of the vessel about 23 feet. The armor forming the

miscellaneous purposes. Provision is to be made for defense against torpedo attacks by means of steel ring nets carried by outrigger booms.

Distilling apparatus and evaporators will be fitted for fresh water supply, the allowance of water to be carried to be sufficient for 15 days, besides water for sanitary purposes.

There will be an electric lighting plant consisting of two divisions, each division having an engine and dynamo, and each dynamo having a rated output of 400 amperes at 80 volts.

The ship will have a radius of action at full speed of 1792 knots, and a radius of action at 10 knots of 6216 knots.

Complement of officers and men will be 566 persons. The hull and fittings were designed by the Bureau of Construction and Repair, under the direction of Chief Constructor T. D. Wilson, U. S. N., and the machinery by the Bureau of Steam Engineering, under the direction of Engineer in-Chief George W. Melville.

The vessel, in all its parts, is to be of domestic manufacture.

The bids received for the construction of this vessel were published in *The Iron Age* of December 22, page 1227. No award has yet been made.

## WORLD'S FAIR NOTES.

### Will the Fair be Ready in Time?

As much discussion has recently taken place over the probability of preparations for the fair not being completed in time, the following extract from an article, which appeared on the 31st ult. over the signature of Director-General Davis is significant:

"Will the exposition be ready in time?" is the question of the hour. Hundreds of thousands of people have visited Jackson park and returned to their homes amazed at the extent and magnificence of the buildings prepared for the reception of exhibits. To such as may have visited the exposition grounds a year ago, when the greatest of the buildings, that devoted to manufactures and liberal arts, was yet but a chaos of construction material, but one answer to such a query will suggest itself. Others who have only seen the completed buildings, and to whom the vastness of unoccupied floors has presented an appalling vista of work yet to be done, may have entertained misgivings as to the possibility of completion before May 1. Others again there will be who have not had an opportunity for personal observation, but who will recall the opening days of previous international expositions, and will predict therefrom a state of unreadiness next May. I think, however, I may be justified in saying that every one, whatever his personal misgivings may be, will join in the universal expression of goodwill toward the exposition, and desire at least that our most sanguine hopes may be fulfilled and that everything will be in readiness when the President of the United States shall declare the opening of the exposition a matter of history.

### Work That Is Yet to Be Done.

To answer the question which now forms such an absorbing topic of discussion I should say frankly that there does not appear any reasonable ground for apprehension as to the completeness of all preparation in the time yet at our disposal. The loyalty and earnestness of every branch of the magnificent organization which has accomplished such marvelous results in the last 18 months will be found equal to the task yet before it, be the strain however great. Whatever human energy can accomplish will be done so far as it rests with the exposition to do and act.

Within the next four weeks every building on the grounds will be the scene of the greatest activity. The task of marking off aisles and avenues on the great floors is already under way. Allotments of space, which have so far been specified only in draftsmen's plans, will be speedily transferred to the floors of the various buildings. Thereafter the work of erecting inclosures and cases for the reception of exhibits will be pushed forward with all possible celerity. Already plans for handling the tremendous traffic are matured. Miles of freight cars will be emptied of their precious burdens with the regularity of a well-appointed railroad. The machinery for installation is well in hand, and inspires every confidence in this branch of the service. Upon the preparation of the catalogue, a work which has never yet been completed at the opening of a great exposition, one department is already engaged with the best assurance of success. In brief, whatever remains for the exposition management to do in the way of providing for the opening will be done.

### The Exposition Management Ready.

Thus far the answer to the question, "Will the exposition be ready by the opening day?" must be an emphatic affirmative. There is, however, another phase of the question which must be con-

sidered, and upon which our predictions cannot be based with so much certainty. Up to the present the work of preparation has been absolutely under the immediate direction of the exposition management. Whether in the difficult task of negotiating with exhibitors or in the physical labor of erecting the buildings the authority of the exposition has been absolute and final. Wherever, for any cause, the work has dragged, extra assistance has been forthcoming. Careful supervision to the minutest detail has led to stupendous results, astonishing even to those under whose charge the work has been accomplished. But now comes a new element in the calculations for the future. The exposition management may do everything in its power, but its power is henceforth restricted according to the promptitude of exhibitors in fulfilling their share of the task of preparation.

### Space in the Electrical Department.

Assistant Chief Hornsby of the Department of Electricity has completed the allotment of the greater portion of the space in the Electricity Building. In doing so he has not only been in advance with the work, but has accorded to France 22,790 square feet on the main floor and England 19,382 square feet on the main floor and galleries. France will occupy the entire northwestern bay. Germany's exhibit will take up 13,384 square feet on the ground floor, east of the French exhibit, and 5998 feet in the gallery. England will secure 7830 square feet in the western part of the building, and, with Canada, occupy 5998 feet in the galleries. Thomas A. Edison, the wizard of Menlo Park, has been allotted 4,471 square feet just north from the center of the building. Mr. Edison will have probably the most attractive space outside of that embraced under the central dome of the building.

The south end of the ground floor has been allotted to large electric firms of the country. They include, among others, the Bell Telephone Company, the Detroit Electric Works and the Brush and Westinghouse concerns.

In the galleries will be installed the phonographs and scientific instruments and specialties. Here will also be shown the exhibits of the insulation and wire people and small displays of foreign countries.

### Painted with Hose.

One of the great novelties in construction work on the Exposition grounds is the paint machine of which there are in the Manufactures Building alone ten in active operation. Thomas Turner of New York is the inventor of the paint machine, and those in use at the exposition grounds are under the direction of C. Y. Turner, the assistant director of decoration. Mr. Turner is a member of the National Academy of Design, and prominently identified with a number of the leading art societies of the country. The principle involved is the use of color mixed with compressed air. The compressor is a rotary one, which, when driven by an electric motor, compresses air from 15 to 18 pounds a square inch; this air is then mixed with calcimine, and both are impelled through a hose upon the surface being painted or calcimined from the nozzle in the hands of two men on the scaffolding. A large part of the interior work in the Electricity and Agricultural Buildings has been done by means of this apparatus.

### An Interesting Transportation Exhibit.

J. E. McNay, Treasurer of the Northeastern Railroad Company of England, contributes to the railway division of transportation exhibits a unique picture of the opening of the Stockton and Darling-

ton Railway, the first in the world used for the conveyance of passengers. The artist was a native of Darlington, and the point of view chosen by him for his sketch is the railway bridge over the Sherne at this place. To the right and left of this drawing will be hung the original announcement and programme of the opening and the original and first time table. Above it an enlarged photograph of the No. 1 locomotive will be placed.

### Engines at the Fair.

We find that errors have been made in the report in *The Iron Age* of December 22, on page 1209, under the heading of "Engines at the Fair." So far as the statement relates to the comparison of the quadruple expansion engine which the E. P. Allis Company of Milwaukee are building for the Chicago Fair and the beam engine exhibited by the G. H. Corliss Steam Engine Company at Philadelphia, the so-called giant Corliss engine at Philadelphia had two steam cylinders 40 inches diameter by 10 feet stroke. It was rated at 1400 horse power, but 602 indicated horse-power was the largest load it ever drove at the Exhibition in Philadelphia in 1876. This machine was supposed to be up to that time the largest engine ever built in this country, but the facts are that the G. H. Corliss steam engine works several years before constructed a similar machine, on substantially the same set of patterns, for the Wamsutta mills, New Bedford, Mass., with steam cylinders 44 inches diameter by 10 feet stroke. The same beam pattern was used for both engines and the same general arrangement of running parts, &c. This engine was started several years before the Philadelphia Exposition opened. The engine which the E. P. Allis Company are building to exhibit in Chicago has steam cylinders 26, 40, 60 and 70 inches diameter by 72 inches stroke. It will be a quadruple expansion engine of the horizontal type to develop 3000 horse-power under best conditions of economy, but, owing to the low steam pressure that will be allowed in Chicago, it will develop there about 2500 horse-power, for it will drive two Westinghouse generators of 1200 horse-power capacity each.

A Steubenville, Ohio, dispatch speaks of the successful use of petroleum fuel in lieu of natural gas, which can now be supplied only to a limited extent to manufacturers in the Ohio valley. The Hall Steel Pump Company of Pittsburgh have furnished the necessary engines and other apparatus, and the oil used is obtained from the McDonald field. The burners used in the Acme Glass Works are made on what is known as the aerated fuel system, where air highly compressed is mixed with crude oil and a tremendous heat is obtained.

The Commissioner of Navigation in his annual report takes a desponding view of American shipping. He shows a loss of tonnage engaged in the foreign trade between the years 1860 and 1891 amounting to nearly 90 per cent. Likewise the percentage of American tonnage entered at American seaports dwindled from 66.04 in 1860 to 20.61 per cent. in 1892. Congress has attempted restorative measures without effect. Imports by American vessels continue to fall off, while imports by foreign vessels reached an enormous volume. For a remedy the Commissioner would reduce the cost of materials used in ship building, admit foreign built vessels to an American registry and pay liberal subsidies. There is no alternative now but to look to a new Congress for remedial legislation.

### The Polley Mechanical Boiler Cleaner.

This device, which is made by the Polley Boiler Cleaner Company of Bath, N. Y., is intended for purifying the feed water for steam boilers. It consists of three or more pans fastened together, forming one continuous pan, and is placed in the steam space as shown in the upper view, Fig. 1.

Each of these pans, with the exception of the last, is divided by cross pieces set at an angle of 80° and extending nearly across the pan. These pieces retard the flow of water, causing it to flow back and forth crosswise. The last pan has a dia-

in Colombia by the company. The first work will be to build a line of 6 to 8 miles of railroad to the mines, which are situated about 6 miles from the port of Viento Frio, about 45 miles northeast of Colon.

### Postmaster-General Wanamaker's Report.

The Postmaster-General's annual report for the fiscal year ending June 30, 1892, which has just been published, contains some features of general interest which are worthy of brief notice. The chief developments of the year in connection with the

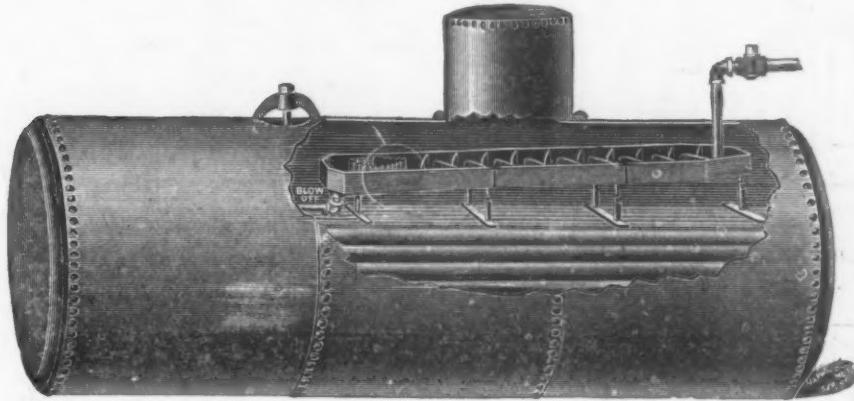


Fig. 1.

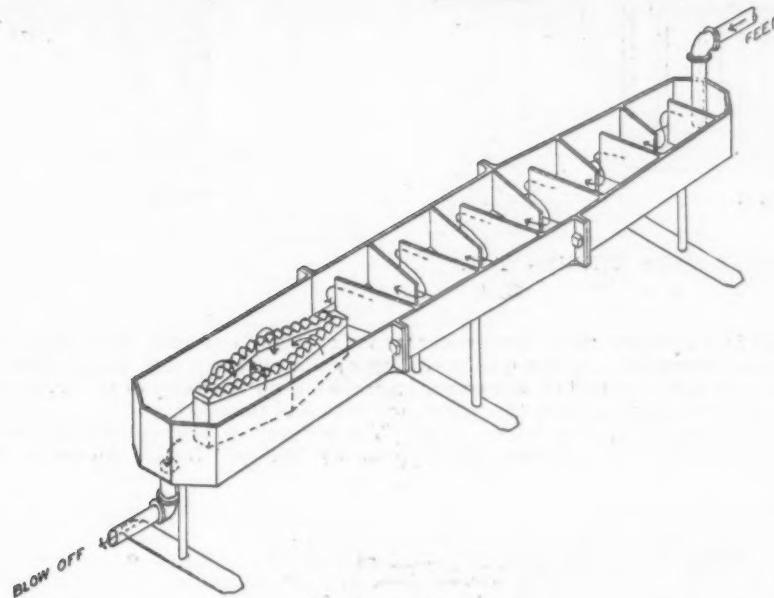


Fig. 2.

### THE POLLEY MECHANICAL BOILER CLEANER.

mond shaped opening near the center, which is surrounded by a lining, corrugated at the top, which rises nearly even with the top of the pan. At the extreme end of the last pan is an opening which is connected with a surface blow-off by means of which the pan is cleaned out. This is shown in Fig. 2.

The pans are made of cast iron, and, being located in the steam space, become very hot, and the feed water in passing the length of the pans is raised to a high temperature, so that the lime, magnesia or other impurities are precipitated in the pan and are disposed of by means of the blow-off. Thus nothing except pure water passes through the corrugations into the boiler proper, which is kept clean and free from scale.

E. J. Chibas of the Caribbean Manganese Company has taken charge of the work of developing the manganese mines owned

Post Office Department, as therein detailed, may be briefly stated as follows:

Five million dollars added to the gross revenue; the deficit reduced nearly a million.

Money-order offices increased two-thirds; or from 10,070 to 16,689.

Eighty-two cities supplied with free delivery.

Twenty-seven hundred and ninety new offices established.

Two hundred and sixty-three offices advanced to the Presidential grade.

Sixteen and three-fourth millions of miles of additional travel.

Fifteen hundred and ninety new mail routes established, embracing 8500 miles of new service.

Ocean mail service extended; pneumatic tube service introduced; exclusion of lottery mail; establishment of postal subsidies; and collections of mail from houses.

### House to House Collection.

In connection with the last-noted item the report runs as follows: "A radical departure in the free delivery service has been undertaken and found to be successful; and it has already been decided to apply it to residences in all free delivery cities where householders will furnish the facilities. It is the collection of mail from houses. As is well known, some 1600 models of house letter boxes have been examined during the last two years by competent commissions; and I expressed the belief in my report last year that it would be found upon actual tests that this collection of mail from house doors could be performed without loss of time to the carrier, and hence without expense to the department, if the time formerly consumed by carriers waiting for persons to come to the doors could be gained, as it was claimed that it would be gained, by the use of the collection and delivery box."

### Time Saved in Collections.

"In Washington City, where the test of one of these boxes was made for one month, an hour or more per day was saved to the carrier; and in St. Louis, where the test of another box was purposely made as hard as possible, it was found that there was actually no loss of time; and the postmasters of St. Louis and Washington promptly and unqualifiedly declared that the collection of mail from houses could be undertaken without the enlargement of the present carrier forces."

An order was accordingly issued to all postmasters that where two thirds of the householders on a route agree to provide themselves with one of the approved boxes, collections should be made at the house doors, and the introduction of house to house collection is now well under way.

The report contains some good illustrations showing the methods of mailing and collecting from the three styles of house letter boxes approved by the commission.

### Pneumatic Tube Service.

An experimental pneumatic tube service between the post office in Philadelphia and the East Chestnut street station in that city is now being inaugurated. The tubular post has been successfully instituted in Berlin and other foreign capitals; and it is expected that it will before long be generally adopted in our large cities.

A contract has just been signed for the equipment of pneumatic tube for the transmission of mail matter between the main post offices in New York and Brooklyn; and the work is to be proceeded with immediately.

### Postal Improvements Advocated.

Among other improvements of which Mr. Wanamaker declares himself to be strongly in favor, are the division of the country into postal districts; free delivery by counties; new post office building and better service—pneumatic or electrical—for New York; the institution of postal savings banks, which have been so successful in Great Britain, and 1-cent postage. The Postmaster-General also strongly advocates the purchase of the telegraph and telephone systems by the Government and their affiliation to the Post Office Department. These, with a number of smaller suggestions, will give ample food for thought to the next occupant of Mr. Wanamaker's chair at Washington.

Rates on Connellsville coke in tons of 2000 pounds from the Connellsville region to St. Paul, Minneapolis and Duluth, Minn., Superior and West Superior, Wis., have been reduced from \$4.75 to \$4.50 per net ton. These reductions went into effect last week.

## TIN PLATE.—IV.

## Tinning and Cleaning Machinery.

The Rogers Tinning Pot.—Rogers' machine, Figs. 37 and 38, is a much more elaborate affair. It consists of a flux box, C, and grease box, B, fitted to the top of the tinning pot. The plates are fed on to

the washman and riser are saved, and the plates have simply to be fed one by one by a careful attendant. The output of IC 14 x 20 is about 80 boxes in the day of 24 hours.

Rogers also has a machine for coating large quantities of plates by means of a rack traveling continuously through a long metal pot. The plates, placed one by one in the rack, are dragged through a flux box and immersed edgeways and longi-

vertical pot. The half-round pot, by which the plates are dipped with a circular motion into a basin-shaped vessel, has also met with considerable success. Such a form does away with a cradle and a similar gear rocking in the metal. On the other hand, it has the disadvantages that feeding rollers moving in the metal have to be provided, and these lick up a certain amount of tin, which is lost; there is a larger surface of palm oil open to evapo-

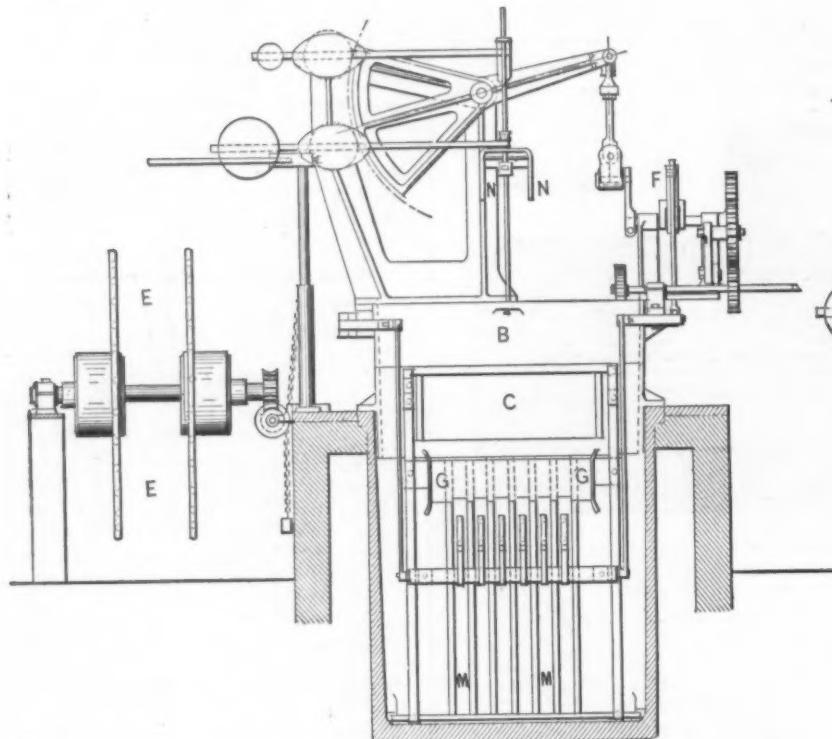


Fig. 37.

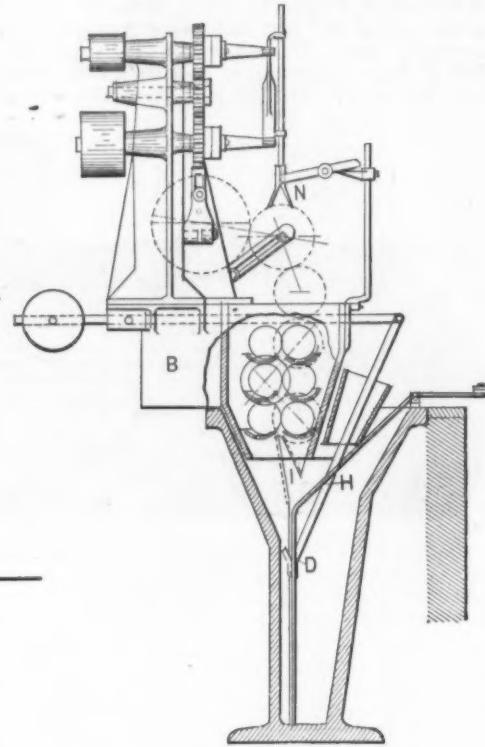


Fig. 38.

## THE ROGERS TINNING POT.

the cradle H, clipped by the spring nippers D, dragged down into the coating metal and directed through the finishing rollers. On emerging from the top pair of these they are seized by the fingers N and automatically transferred to the revolving rack E, standing in front of the tin set. The bars carrying the clips D run at their lower ends in guides and they are given an up and down motion by side levers operated by a crank, F, the levers being balanced at their longer ends by weights. The plate to be coated is passed through the flux box between the guide plates G and caught by the spring clips. It is carried by the clips down into the molten metal, and is caused, by the bars of the cradle H bearing against it, to assume a vertical position, so that when it is afterward raised its top edge will be guided by the ribs M and the guide box I into the finishing rolls. The rack E consists of a pair of cast-iron bosses covered with a sheet of india rubber to prevent injury to the plates as they are dropped, and carrying a series of radial arms, between which the plate may be placed by the pick-up gear. At the moment when the pick-up gear is dropping a plate the rack is stationary, and a mechanical appliance causes it to revolve intermittently. By this means the plates are kept on edge, and separated, until they have cooled enough to be removed to the scouring machines without damage.

The machine is well designed and works with a surprising smoothness and precision. Of all other machines it has the advantage of least parts moving in the molten metal. By its use the wages of

tudinally in the coating metal for a greater or less time, depending on the quality of plate desired and the speed of the traveling rack. The rack delivers the plates into a receiving rack, from which they can be taken one by one and passed

ration; there is usually more than one firing grate necessary, and, finally, there is perhaps a slight tendency to coat more on one side than the other.

The best known machine of this type is probably that of Daniel Edwards, of

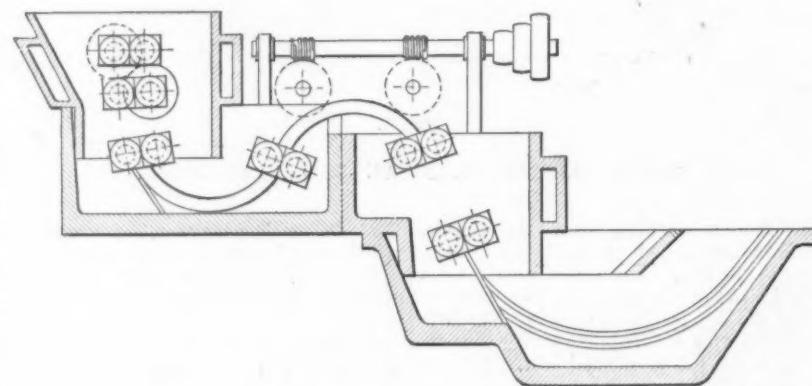


Fig. 39.

## THE EDWARDS TINNING POT.

through the grease finishing pot. By this arrangement a given amount of labor will coat a very large quantity of plates; the weight of tin in the bath is small in relation to the output, and a uniformity of speed obtained in the movements insures a perfect uniformity of coating.

The above machines embrace all those which are typical of what may be called the

which Fig. 39 is a diagrammatic view. In the tinning pot are several guides forming a rack, in which three plates at a time may be immersed in the metal. The plates are forced with the tongs into the nip of two pairs of rollers immersed in the flux box (the rollers being worked by intermediate gearing and worm and worm wheel), from which they are withdrawn and forced

under an arched guide into the nip of a pair of rollers immersed in a third vessel containing coating metal, and from thence up through the finishing rollers in the grease pot. The machine has an output of from 80

shown in both views. At the surface of the metal, and where the grease rests upon it, are a pair of scruff doors, O, which practically inclose the guide P and retain the floating dross. The sweeping motion

liver the plates one by one as they leave the finishing rolls on to a traveling endless belt or upright rack by which they may be carried to the scouring machines. Such a contrivance, though by no means generally used, will present no mechanical difficulties.

The oxide and scruff that is removed from the surface of the metal and grease from time to time is collected and melted in a cast-iron pot, the fining being done in the usual way with stirrers and chips of oak. Although ferruginous and not good in color, the ingots obtained may be used for ternes or the first coating pot. Zinc or other valuable elements in the flux are not usually recovered.

**Cleaning and Dusting.**—It is unnecessary to describe the well-known operations by which the plates are freed from grease and polished with bran and sharps and sheepskins, but it may be remarked that the appearance of the plate is not at all an unimportant matter to the seller and this department should receive much attention. When cleaned by hand, it is done in this country for a labor cost of from \$1 to \$1.50 per 100 boxes.

It is not unusual to find that the plates, after a preliminary scouring by hand, are passed by india rubber feed rollers between pairs of rollers covered with sheepskin and revolving at a high speed, a method which gives a polish much superior to that obtained by hand and frees the plate of dust. Such dusting machines are commonly used. But scouring machines are not used to the same extent.

**The Thomas Machine.**—Thomas' machine may be described as follows: The plates, as they are removed from the grease finishing rollers, are placed one by one on a fixed inclined cradle, from which they are taken immediately by fingers attached to an endless chain band traveling in a horizontal direction into the first bran box. The chain is turned over a drum in this box and travels again horizontally toward the second bran box, over another drum toward the far end of the machine, and the plate is dropped by gravity upon a table at the moment of passing over a third drum. The action is illustrated by the diagram, Fig. 42. By this method, as will be seen, the plate is not plunged immediately into the bran, but in its passage has time to cool and harden, and it is turned completely over between the first and second bran boxes in such a way as to insure the proper cleaning of both sides. The cant given the plate in leaving the bran causes little of the latter to be carried away and wasted. The whole machine may be mounted on a wooden frame, in-

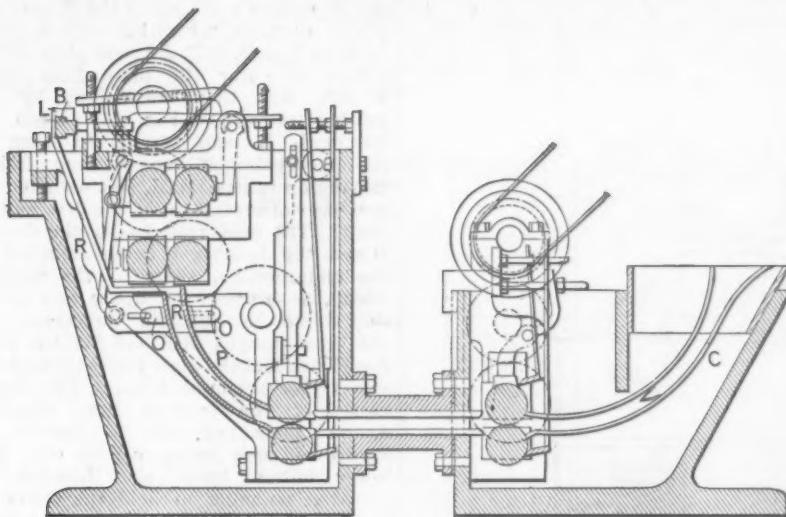


Fig. 40.

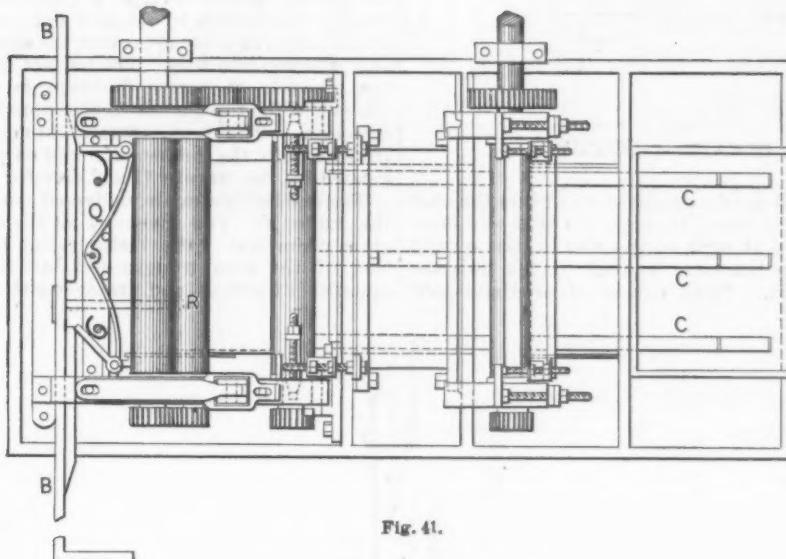


Fig. 41.

## THE THOMAS TINNING POT.

to 100 boxes in 24 hours, and the wages of a washman are saved.

R. B. Thomas' machine is very similar in idea, as indeed are a number of others. For ternes a very large number of simpler machines are in use, consisting of a half-round pot with one pair of exit rollers.

**The Thomas Tinning Pot**—To complete this subject one other machine of this type is shown in Figs. 40 and 41. It is that of John G. Thomas, and is of such a form as to surmount many of the objections enumerated above. The grease pot is connected with the metal pot by a narrow gate or neck into and from which the plates are guided by rollers in the usual way. The difference in temperature of the two pots may easily be maintained as the connecting neck is so small. In the middle of the guides C which conduct the plates through the flux to the first pair of rollers are a pair of asbestos brushes set at an angle so as to clean the surface of the sheet of any scruff or dross that may be adhering to it. The rollers are so arranged in bearings as to admit of their being adjusted and closed when required, and they are held together with arrangements of spring levers. Each roller is provided with a scraper, the position of which is regulated by rods passing to the top of the pots. The scruff which may collect on the top of the outgoing guide P may be removed by a scraper, R,

is given to these doors by connecting them with rods to the framing L. The levers shown have fingers which are acted upon

by tappets fixed to the sliding bar B, and the doors are kept in their normal position, shut, by the spring Q.

Whatever machine is used, in order to keep the labor cost at the lowest possible point, arrangements should be made to de-

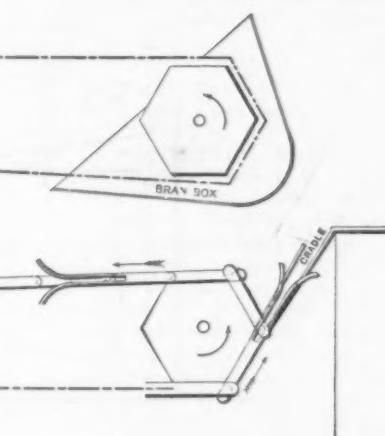


Fig. 42.—THE THOMAS CLEANING AND POLISHING MACHINE.

closed on the sides, and it works with great precision.

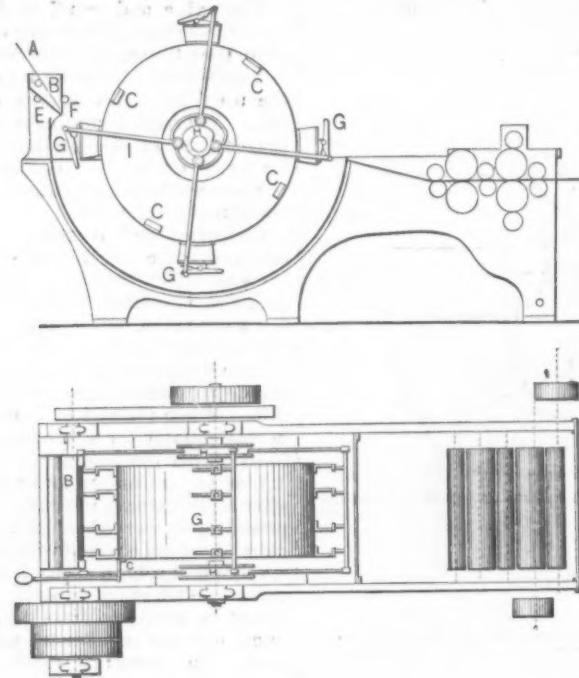
**The Abbott Machine.**—Abbott's machine consists of a pair of drums revolving in opposite directions in semicircular bushes and mounted with parallel axes

sufficiently near to each other to allow the cradles or fingers on the periphery of the first drum to engage with those of the second. The plate from the tinning pot is placed as before on an upright inclined cradle and automatically released at the

B, which has doors, E and F, opened periodically by tappets, C, acting on the lever D, Fig. 44. A drum revolving in bran has four nippers, G, opened and closed at the proper times by the ring cam H, through the rods I. The plate

material in such machines, they have a natural tendency to clean in streaks as the wool rollers wear, and it goes without saying that the best results will be obtained by a machine giving in addition a reciprocating motion. Figs. 45, 46 and 47 give side and end elevations and plan of the Rogers and Player machine, which has such motions. In these figures, C C, &c., are pairs of feed rollers to carry the plate from right to left, and they are driven by the gearing shown in Fig. 46. Upon the frames L L, and parallel to them are mounted pairs of reciprocating frames moving on rollers, M M, and actuated by two pairs of eccentrics on the first motion shaft. The bran troughs B, the dusters D and the brushes C being mounted on the reciprocators, share in the motion, which, as between the upper and lower, should be in opposite directions, and the bran troughs B B are divided horizontally so that the plate passes through the descending stream of bran. The upper halves of the troughs have brushes, n, on their exit side to prevent an excess of bran being carried off. The lower halves have also brushes inclined at an angle to hold the plates up against the top weight of bran. The three pairs of dusters D are covered with sheepskin, and though free to revolve they have no positive motion except a rhythmical step-by-step motion by ratchets and pawls (not shown), in order to prevent the sheepskin wearing into flats. The bottom dusters move in the same direction as the plates and the top dusters in the opposite direction. The bran escapes from the troughs into the hopper K, and is circulated by the traveler H and elevator F.

The finished plates are delivered on to the table X. The inventors of the machine claim that "the reciprocating motion of the bran troughs and dusters in opposite directions and transverse to the



Figs. 43 and 44.—THE HOPKINS CLEANING MACHINE.

proper moment so as to drop into the slow-traveling fingers of the first drum, which seize it across the edges with a claw-like action and drag it edgeways around the bottom of the semicircular bran tub. At half a revolution the claws disengage and those of the second drum, traveling in the opposite direction, carry the plate through the second branning, the upper side of course now being underneath. The distinct advantage of this machine is that the plates are held edgeways throughout and cannot be injured. On the other hand, the fingers require very nice adjustment, and too often foul the plates in the most disastrous way. There are a considerable number in use, but machines requiring such absolute mechanism cannot be considered satisfactory.

**The Hopkins Machine.**—The claws in Abbott's machine are done away with

drops at the proper moment into the open clip, is taken through the bran and is released at such an angle as to slide quietly down the table leading to the finishing rollers. These consist of alternate pairs

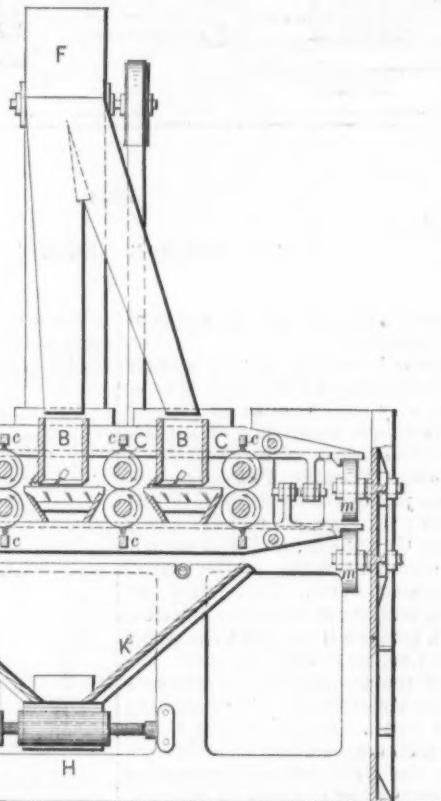


Fig. 45.—Elevation.

#### THE ROGERS AND PLAYER CLEANING MACHINE.

in that of Hopkins', Figs. 43 and 44, which is otherwise very similar in idea, namely, fingers traveling in a semicircular bran tub, save that the second tub is entirely omitted. In this machine the plate A is placed by the riser in the box

of feed rollers covered with india rubber and sheepskin rollers, the last pair of the latter being cleaned by flying rollers running in the opposite direction.

**The Rogers and Player Machine.**—Large as is the saving of labor and ma-

travel of the plates through the machine, while thoroughly cleaning the plates, offers such slight resistance to their passage that the finest gauges are operated on without damage, as there is nothing to interfere with the action of the bran, all

the grease is removed before they come to the dusters, and they are finished free from scratches and buckles."

The cost of cleaning and dusting by machine, with an allowance for motive power and interest on \$800, is no more than 60 cents per 100 boxes, labor being

#### The Orvis Down-Draft Smoke Consumer.

Something new in the form of a furnace on the down draft or inverted syphon principle is being perfected in Chicago by

patents have only recently been secured, and for that reason no general tests of the Orvis device have been made. A series of experiments have been carried on at the Monon Building, and one boiler in the plant is now equipped with a furnace which Orland D. Orvis asserts cannot be made to smoke while producing steam.

The furnace consists of two water grates, each covered with a double steel arch. Each grate is about 9 feet long and 23 inches wide. The covering arches have double walls of boiler steel and are filled with water which is in circulation with that in the boiler. The grate bars are hollow and are also in circulation with the boiler. The two portions of the furnace form covered retorts. The front end is open, but the rear, sides and top will be inclosed. Between the two retorts is a space of 8 inches. The fire is laid in the two grates and the draft is through the furnace doors and down through the grate bars. When the furnace is in operation the flames pass down through the coal and up through the 8 inch space between the two grates to the boiler shell. In the meantime the heat of the fire is absorbed directly by the water chambers surrounding the grate and in the grate bars themselves.

The descending currents through the fire are drawn into the passage of rapidly ascending gases between the arches before they really have time to rise vertically against the under surface of the grate bars and combat the descending currents, as is the case where these gases have a long run before reaching a free, upward passage of escape.

An important advantage is, therefore, gained by having an up-draft passage along the side of the arches, in that the length of the grate surface may be extended without limit and a correspondingly larger area of grate surface be operated without any reduction or retardation of the draft in any portion of the furnace.

The double arches permit the benefits derived from alternate firing; or different grades of coal may be burnt simultaneously within each arch; and there is always a continuous flow of heat to the boiler from one furnace while the fire in the other one is being cleaned, thereby maintaining a uniform degree of heat on the crown sheets of the boiler, and also preventing smoke at all times.

The accelerated draft in this furnace renders it practicable to apply the well-known principle of perforated plates as fire doors in place of running with the fire doors wide open, and roasting or driving the firemen out by radiated heat. These perforated doors are of great utility in admitting a sufficient volume of atmospheric air in a divided form and at the same time retaining the heat within the furnace, an original feature in down draft furnaces.

The closed arches spanning the grate bars confine the burning fuel within the limits of a retort and, acting by reverberation, concentrate the heat upon the burning fuel. A shovel of coal thrown within this highly heated chamber is forced into the most rapid form of combustion, thereby yielding its maximum degree of heat units for absorption by the water surfaces in the shortest space of time. By this system the heat is confined within the furnace a sufficient length of time for its complete absorption by the water surfaces instead of escaping in the usual wasteful manner up the chimney.

The usual custom in kindling a fire is reversed. The grate bars are covered with coal and the shavings are laid on the top of the solid fuel.

The first steamship built in England from the American steel barge model will have her trial trip in January. She cost \$112,500.

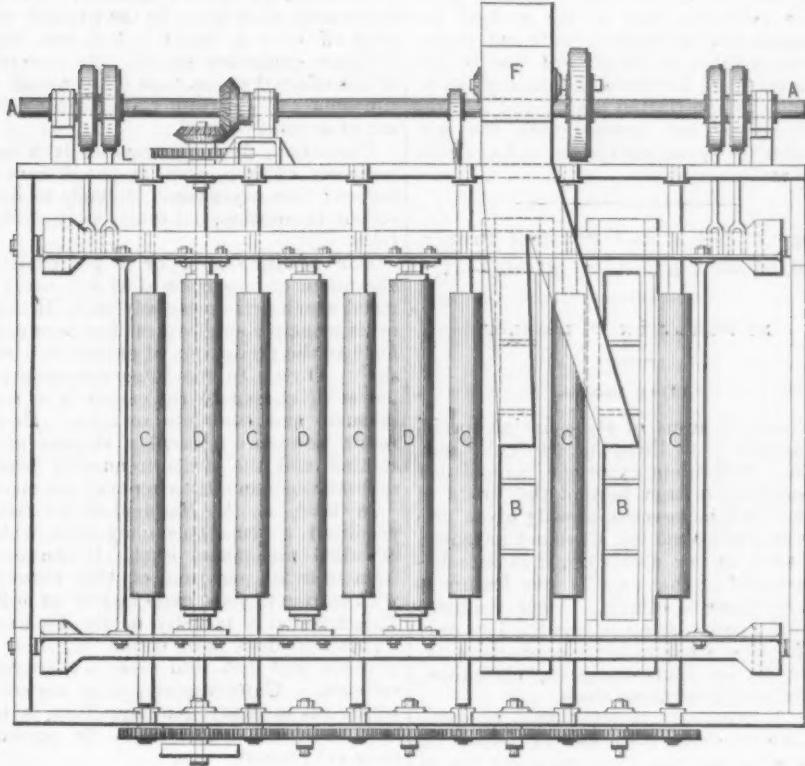


Fig. 46.—Plan.

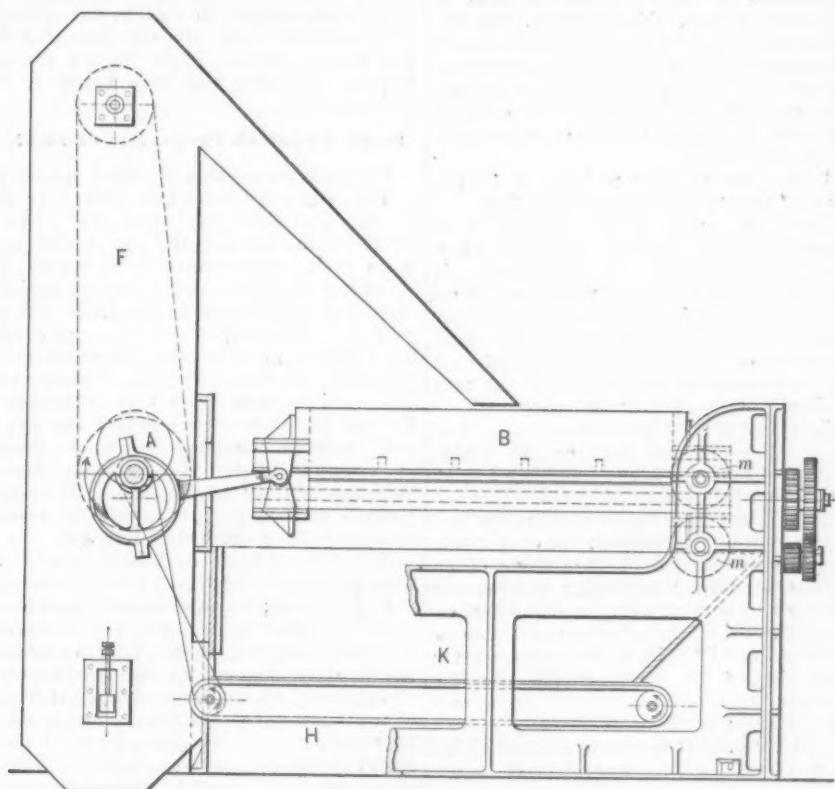


Fig. 47.—Side Elevation.

Figs. 46 and 47.—THE ROGERS AND PLAYER CLEANING MACHINE.

confined to one man at \$2 per day. This, like many other departments, may perhaps be suitably let by contract to a responsible man, who, if he were paid 35 cents per 100 boxes on the output of a four-mill plant, should make a very good thing of it. There is no doubt about the economy effected by machine dusting.

the Orvis Brothers Down-Draft Furnace Company, which will go to swell the list of devices brought out to meet the demand created by the constant agitation of the smoke nuisance question. The method of adapting the down-draft principle differs materially from that in use in a number of other furnaces on the market. Final

**British Naval Forced Draft Rules.**

An article on "British Naval Speed Rules," which appeared in *The Iron Age* of December 22, 1892, was based on a regulation issued lately by the British Admiralty. This recent regulation governs the different degrees of power to be used under various conditions of service, the prescribed standard for any ship being her authorized power with natural draft, the highest covered by the rules given. An earlier regulation which has been in force for some time defines the term "natural draft," as employed technically in the British naval service, and deals with the use of forced draft in ships of war. The following are in substance some of the provisions of the earlier regulation. They are of interest in connection with the rules recently adopted, as completing the presentation of the subject.

The term "natural draft" implies, in the case of ships fitted with close fire-rooms and fans, that the air required for combustion, ventilation, &c., is supplied by the fans, but with little or no pressure (as indicated by the water gauge), and with the fireroom doors open or closed as may be found desirable.

As a matter of convenience it is suggested that, when under steam, the fire-rooms be kept closed and the fans used, the speed of the fans being regulated as required to supply the air necessary for the fires and for proper ventilation.

The use of forced draft appliances at their full power, or, in other words, above the  $\frac{1}{2}$  inch pressure, is forbidden except for short periods under very exceptional circumstances. These appliances must be used, however, under most conditions, for securing the proper supply of air when vessels are steaming at moderate speeds.

The specified natural-draft power, which can usually be obtained with an air pressure not exceeding  $\frac{1}{2}$  inch of water, should be considered the maximum horse power for continuous steaming at sea. It will be recalled that under the rules recently adopted this power is hereafter to be used only during four hours of the quarterly passage trials or in an emergency.

The maximum specified power with forced draft is obtained with an air pressure of from  $1\frac{1}{2}$  to 2 inches of water, and this is specially provided to be applied in cases of emergency, and for very short periods only. On general service the boilers are never to be forced to this extent, except under the direct orders of the commander-in-chief of the station, who is required to make a report explaining why such orders were given. Full power trials are, however, ordered by commanders-in-chief, at their discretion, in any cases in which such trials are deemed advisable.

Torpedo gunboats, torpedo boats or other vessels with locomotive or special types of boiler, are governed by special instructions.

The foregoing provisions, adopted as the result of extended experience, regulate the present practice in the British Navy. To afford a basis of comparison, it may be added that a few years ago the rule in force was for a ship to have full power trials twice a year, the engines and boilers being then worked to the utmost extent of their capabilities after being brought up gradually to full power. On each such occasion the full-power trial was to be continued for not less than 12 hours.

The general depression in trade and agriculture in Great Britain is the subject of discussion in an article from the pen of Jesse Collings, M.P., addressed to one of the periodicals. He points out that the greatest competition with the British farmer comes from the United States, and urges that more attention should be given to the production of smaller articles of food,

now imported from abroad. "Surely," says Mr. Collings, "Great Britain is as fitted to produce cheese as it is to manufacture steam engines and girders." His main argument is based on the proportion of the land under cultivation in the United Kingdom, the total being 48,000,000 acres, of which only about 9,000,000 are being worked. Other questions aside, the fact is too evident for question that as respects cattle and grain, formerly the main reliance of the British farmer, Great Britain is thoroughly handicapped by the United States, and that the odds against her increase with the perfection of ocean navigation and agricultural machinery.

**Some Chemical and Physical Properties of Steel and Alloy Steels.—II.\***

BY PROF. JOHN W. LANGLEY.

**Alloy Steels.**

There are forms of steel having special properties to fit them for particular purposes. Within our experience no addition of anything to iron beyond the limits of carbon and manganese, already given, improves it as a steel for all-round purposes. As soon as we specialize, it at once becomes evident that gain in one feature is met by losses in others. Hence the number of special steels is small. The only useful alloy steels hitherto produced commercially are four—tungsten, chromium, nickel and manganese steels.

It is popularly believed that tungsten renders iron very hard, and in support of this is the fact that there are many brands of so-called self-hardening steel on the market—that is, of a steel which does not require to be rapidly cooled in order to become file-hard. Nevertheless, this belief is erroneous, for if a steel be chosen not excessively high in manganese and carbon, as all the self-hardening specimens are, then no amount of tungsten will make it file-hard if allowed to cool spontaneously in the air.

I have made alloys as high as 30 per cent. of tungsten which could be filed.

The true function of this element is to delay the rate of change of carbon when either going into or out of solution. It acts somewhat as glue in water would do toward the latter's power to dissolve salt or to permit it to crystallize out. The final solubility of the salt is not much affected by the presence of the glue, but the rate of dissolving is enormously lengthened.

In tungsten steel this results in giving to a lathe tool, for instance, the useful feature of taking a heavy roughing cut at a considerable peripheral speed which, of course, heats the tool considerably, but does not draw the temper, while a plain carbon steel tool would have some of its carbon thrown out of solution and become softened by so high a duty. The effect of the tungsten is, then, to require a change in the value of  $t$ . If, in the equation for hardening,  $t$  has its usual value of a few seconds, the tungsten steel will crack and fly to pieces; but if it is prolonged to a few minutes, as in spontaneous air cooling, then a hard product remains. If in annealing the usual time is taken, a tungsten steel will be imperfectly softened; but if  $t$  is lengthened sufficiently satisfactory results may be obtained.

Tungsten steel is neither so hard nor so strong as plain carbon steel; hence there is no advantage in using it except for special purposes. An incidental result of the function of tungsten in delaying changes of carbon was discovered by me some

years ago and is now known as the emery-wheel test.

If ordinary steel be touched to the surface of a revolving emery wheel, it will give off a shower of brilliant sparks which explode into smaller fragments after they have been projected from the face of the wheel. This appears to be owing to the combustion of the contained carbon; but if tungsten steel is put to the wheel it will give off only a dull red fire, free from brilliant exploding sparks. So powerful is this effect that less than 0.5 per cent. of tungsten can be readily detected by the use of an emery wheel.

Chromium, like manganese, is a true hardener of iron even in the absence of carbon; like manganese, it tends to hold carbon in solution, but much more powerfully.

The addition of 1 or 2 per cent. of chromium to a carbon steel will make a metal which gets excessively hard. Hitherto its principal employment has been confined to the production of chilled shot and shell. Owing to the intense mordanting power of chromium the carbon is in very intimate and complete solution. Hence result powerful molecular stresses after cooling, and the shells frequently break spontaneously months after they are made.

In 1888, R. A. Hadfield of Sheffield, produced a remarkable alloy steel, which he called manganese steel. It contained from 10 to 20 per cent. of this element, with carbon in some cases as low as 0.50. This material is initially nearly file-hard. Annealing does not soften it, but if plunged red hot into water it is slightly softened. Unfortunately, this material, which has so many good qualities, is too hard to be tooled, and hence its applications are limited.

The same metallurgist has introduced a silicon steel, in which a large part of the carbon is replaced by silicon. This material is less subject to the injurious action of phosphorus than ordinary steel, but it does not surpass the latter in any useful physical property and falls below it in some others.

**Some Physical Properties of Steel.**

The most remarkable physical property of high steel, the one which gives it value as distinguished from iron and other structural metals, and the one which belongs to it almost exclusively, is that of becoming intensely hard when cooled rapidly from a temperature a little above redness. This subject has long exercised the minds of metallurgists, physicists and chemists. A check list of the literature of this subject would be very extensive. For the purposes of this report the subject will be confined to work done in connection with the Crescent Steel Company and to the writings of William Metcalf and myself, followed by some recent articles published in England.

If a bar of high steel is broken by a transverse stress, the fracture will be rough and crystalline; this appearance is spoken of as the grain by practical steel makers. It refers primarily to the broken surface and it does not assume that the internal arrangement in the undisturbed particles of the bar at a distance from the end will be identical with the appearance of the fractured surface, because, at the moment of rupture, the metal is subject to compressive and tensile strains which must have an important effect in placing the particles in the final state where they become visible on the surface. But while there is not identity of arrangement, still there will be a constant relation between the superficial and internal particles, so that it is legitimate to classify steel by its fracture. The term grain, then, relates to the crystalline structure of the metal, and it must be carefully remembered that it does not imply either a fibrous or a cellular structure. In fact, steel which has

\* Presented in a discussion on Structural Steel before the American Society of Civil Engineers.

been thoroughly melted is wholly free from fiber or cells. Mr. Metcalf devised, in 1876, a simple but beautiful method of showing the dependence of the grain upon the temperature at which a piece of hot steel is cooled in water. His method is the following: Take a bar of steel about  $\frac{1}{4}$  inch in diameter and nick it with a chisel in six points about  $1\frac{1}{2}$  inches apart, and number them. Now heat the bar so that the No. 1 piece at the end shall be nearly white hot and scintillating, while No. 6 is not red hot, the temperature varying gradually between these extremes and having approximately the following optical appearances: No. 1, scintillating; No. 2, yellowish white; No. 3, lemon yellow; No. 4, orange; No. 5, reddish orange; No. 6, black. Now, cool the bar in water and break it into six sections. Then the fracture will appear as follows: No. 1, coarse brilliant sandlike particles, very hard, but which crumble off readily. Probably the piece will be cracked down its side. No. 2, brilliant and sandy, but the grains smaller than No. 1; probably it will be cracked. No. 3, a brilliant gray crystalline background, showing sandy particles. No. 4, a very fine-grained satin-like luster, the individual grains about  $\frac{1}{1000}$  inch apart and wholly free from a sandy appearance. This is called the refining point. No. 5, like the preceding, but coarser and with a softened luster. No. 6, more decidedly crystalline, the grain coarser than No. 5, and the luster softened as though an infinitesimal film of oil was on the surface.

On trying the above with a file, No. 1 will be found glass hard, but destitute of strength; No. 2, glass-hard and a trifle stronger; No. 3, very hard and moderately strong; No. 4 will scratch glass with difficulty, but is very strong and elastic; No. 5 can be filed, is very elastic; No. 6, soft. No. 4 gives the maximum of useful properties; it is that at which hardness and ductility are combined in the best proportions. This refining point is then a critical temperature condition, at which all steel should be hardened. It is not rigidly fixed, however, for it varies with the quantity of carbon in the steel. The above description applies to steel holding about 1 per cent. of carbon. The refining point will move up the temperature scale—*i. e.*, toward the hotter end the lower the metal is in carbon.

The appearances noted above are intimately connected with the change of shape in the crystallization—*i. e.*, grain of the steel, and also with powerful internal stresses which are probably molecular in character; also with chemical differences in the amount of dissolved carbon. The evidence for this statement is ample. The changes in grain are directly visible to the eye, also they can be noted mechanically by the concomitant variations in hardness and ductility. As to the existence of internal stresses, the cracking of overheated pieces and the retraction of the edges of a ring of hardened steel after it has been broken show the fact clearly; also, there is a change of volume on hardening. There is an expansion, the amount of which varies with the quantity of carbon in the steel and the degree to which it was heated at the moment of plunging it into the water; it is sufficient in amount to decrease the specific gravity to a notable degree. In 1876, I made some tests of Crescent steel, the results of which were published in the "Proceedings of the American Association for the Advancement of Science" of that year. The following table summarizes them. The first vertical column gives numbers of a set of ingots differing from each other in carbon, but alike in other respects. The upper horizontal line gives the numbers of the nickel pieces broken off from rolled bars made from certain ones of these ingots and heated at one end,

as has just been described. No. 5 was black hot and No. 1 scintillating. In the columns below these numbers are the corresponding specific gravities:

Table No. 2.—Specific Gravity Table.

	Specific grav- ity. Ingot.	Carbon.	Bar rolled.	No. 5.	No. 4.	No. 3.	No. 2.	No. 1.
1...	7.855	0.302	.....	.....	.....	.....	.....	.....
2...	7.836	0.450	.....	.....	.....	.....	.....	.....
3...	7.841	0.529	7.844	7.831	7.826	7.823	7.814	7.818
4...	7.829	0.649	7.824	7.806	7.809	7.800	7.811	7.791
5...	7.838	0.801	.....	.....	.....	.....	.....	.....
6...	7.824	0.841	7.829	7.812	7.808	7.790	7.784	7.789
7...	7.819	0.867	.....	.....	.....	.....	.....	.....
8...	7.818	0.871	7.825	7.790	7.778	7.758	7.755	7.752
9...	7.813	0.955	.....	.....	.....	.....	.....	.....
10...	7.807	1.005	7.826	7.812	7.789	7.755	7.749	7.744
11...	7.803	1.058	7.825	7.811	7.798	7.769	7.741	7.690
12...	7.805	1.079	7.825	7.811	7.798	7.769	7.741	7.690

of the rolled bar and probably all internal strains. It shows the state of the steel at what may be called normal density. Now, the ordinate at four shows the refined and hardened metal, consequently the stresses due to hardening will be proportional to the differences between these two ordinates, which are slight; but

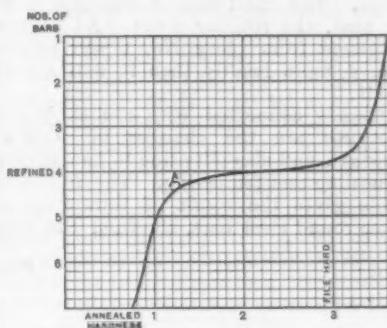


Fig. 4—Curve of Hardening.

if the steel has been heated to the temperatures corresponding to ordinates three, two or one, the departure from five is much greater, and hence a liability to rupture. It is very rarely that steel cracks at the refining point.

In Fig. 3 the specific gravities for ingot and bars numbered 3, 8, 10, 12, have been

the degree of hardness also varies with the quantity of carbon and the tempera-

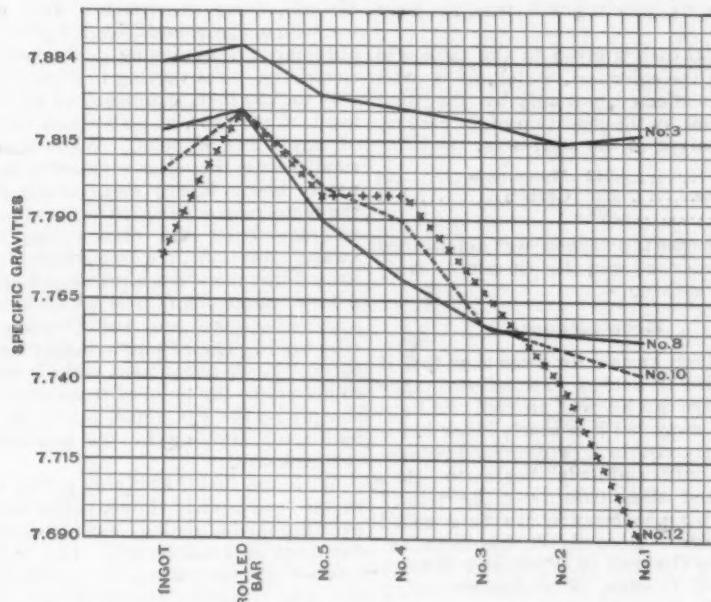


Fig. 3.—Specific Gravity Curves.

plotted as curves. It is interesting to note that the effect of rolling has been to increase the density. Also that the decrease in specific gravity increases with the quantity of carbon, as shown by the way No. 12 pitches down to the base line while No. 3 is approximately horizontal. The refining point is that of the temperature corresponding to the figures in the column headed No. 4 at the bottom.

Mr. Metcalf has found the explanation of the liability of steel to crack in hardening in the expansion which it undergoes, as the above table of specific gravities proves.

The violent stresses set up by differences in the amounts of the expansion of hardening of parts of a bar due to overheating, or to unequal heating, account, in his judgment, for cracking, and lead to the practical injunction not to heat the steel any higher than the minimum necessary to harden it—*i. e.*, the refining point. In Fig. 3 the ordinate at 5 shows the state of the metal heated to an incipient red. This is enough to remove the increased density

ture of cooling. The maximum rate of change from soft to hard occurs near or at the refining temperature, but it is not strictly confined to this point. If a bar is nicked and heated, as previously described, and then tested with a file, beginning at the cold end, a very slight increase in hardness can be felt till we come very near the refining point, when a very great increase occurs, and the file ceases to bite and slips over the surface. For all higher temperatures it will continue to slip, so that the bar seems equally hard up to the end which scintillated. But this is owing to the file being no harder than the test piece. If a diamond is used it will be apparent that there is an increase of hardness above the refining point. From tests recently made the following curve has been constructed.

In Fig. 4 the curve starts from the annealed bar. At  $a$  it begins to enter upon the refining stage. The curve now becomes nearly parallel to the axis of hardness. It is not possible to give quantitative precision to the axis of hardening, because

there are no trustworthy means for measuring this properly. The sensation to the hand when moving a diamond over the pieces of steel, together with a microscopic examination of the scratch, leave no doubt that the metal cooled from temperatures above the refining point sensibly gains in hardness, although the increase is not large. The chief gain in hardness is at, or near, the refining point. An angular fragment from piece No. 1 will scratch No. 4 more readily than it will scratch itself.

Closely connected with the subject of hardness are the changes in ultimate strength and elasticity due to hammering, annealing and tempering. The following table gives the result of tests made on some round steel bars, all from the same

What has really happened is this: The cooling goes on continuously, but at this point the sudden generation of heat from within balances the external losses, and so the pointer has only the horizontal component of its motion left.

Osmond has shown that a similar point exists for pure iron at 855° C., only it is not so strongly marked. He thinks that this denotes a molecular change in the iron, while the 655° point in steel indicates a change in the relation of carbon to iron. Roberts Austen has also pointed out that the temperature at which steel ceases to be magnetic is identical with the point of recalescence. He also says it is impossible to harden a piece of steel by plunging it into water at any temperature below the recalescence point.

Table No. 3.

Number.	Treatment.	Angle of cold bend.	Carbon.		Diam.	Elastic limit, pounds per square inch.	Tensile, pounds per square inch.	Elongation, per cent.	Red area, per cent.	Grain.
			Total.	Semi-graphite.						
1	Cold hammer bar.	153	1.25	.47	.575	92,420	141,500	2.00	2.42	Fine.
2	Bar drawn black.	75	1.25	.47	.577	114,700	138,400	6.00	12.45	Fine.
3	Bar annealed . . . .	175	1.31	.70	.580	68,110	98,410	10.00	11.60	Fiery fine.
4	Bar hardened and drawn black . . . .	30	1.00	.36	.578	152,800	248,700	8.33	17.9	Fine.

ingot, which were tested by tensile stresses, and also by bending till fracture took place.

The total carbon given in the table was found by the color test, which, as is well known, is affected, not only by the total carbon, but by the condition of the carbon.

The analysis of the steel was:

Silicon.....	.242	Manganese.....	.24
Phosphorus.....	.02	Carbon.....	1.31
Sulphur.....	.009		

In this case the carbon was determined by combustion, and is, therefore, truly the total carbon.

#### Recalescence.

It has been known for some time that if a steel wire is heated to a yellow-orange temperature and allowed to cool its light will fade away till it is nearly black hot—i. e., barely visible in a darkened room—when it will suddenly begin to glow afresh and then fade away the second time. This phenomenon has been called recalescence. Recently it has been examined by Osmond of Paris and Roberts Austen of London, each observer using very delicate electrical pyrometers by which accurate registration of temperatures was accomplished. These observers show that recalescence is not confined to wires, but takes place in a mass of steel, however large, only it is not readily exhibited to the eye, except in quite small wires.

They show that if the pyrometer is inserted in a piece of steel which is cooling down from a high temperature, and the re-

Very recently, in connection with Mr. Metcalf, some experiments were carried out which throw additional light on the phenomena of hardening. We heated, by electricity, wires varying in diameter from .035 to .250 inch, composed of steel holding 1.30 per cent. of carbon and very little of any other element. When using the smaller sizes the wires would cool down to nearly black before recalescence set in, the temperature then rising suddenly to an orange color and then fading slowly away. Moreover, if a cold wire was slowly heated up there was a prolonged arrest at a dark orange color, after which a sudden apparent access of heat would set in and the wire would go rapidly on to higher temperatures. These phenomena make it possible to determine the point of recalescence very sharply by the eye alone, provided it has had some training in the estimation of temperatures.

We found that the refining point, which, as has been already stated, is the best temperature for hardening, was identical with the point of recalescence. This is a most interesting observation, for it shows that the refined grain, originally selected by the eye alone, as guided by shop practice, is now proved to be that very remarkable stage in the heating of steel where occur, in addition to the most useful degree of hardening, the loss of magnetic property and an important thermal change revealed by the pyrometer. The relation between the hardening and recalescence temperatures may be shown by combining Figs. 4 and 5, drawing them to the same temperature scale and placing one below the other.

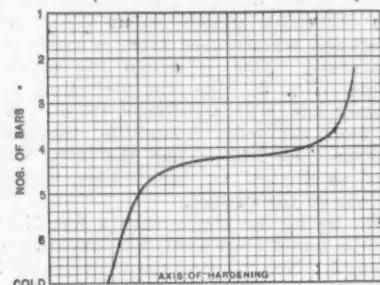
In extending this work I encountered a new fact. If the wire is heated to a lemon color and then allowed to cool to nearly a black and then plunged into water just before the recalescence rise takes place, it will be thoroughly hardened; but if it is heated from an initially cold stage to this same temperature it will not harden. So this experiment proves that steel may be thoroughly hardened at much below the recalescence point.

At first sight it seems as though this contravened what has previously been said; but it does not, if the following explanation is accepted:

During the heating of the wire just below 655°, a breaking up of the crystals and a rearrangement of the particles takes place. Heat is rendered latent and is

stored up, precisely as in the melting of ice. During the cooling of the wire from a high temperature, heat radiates away uniformly till the recalescence point is reached, when the stock of latent heat suddenly becomes available at or below 655°, and a brightening of the color results. A small wire can part with its heat so rapidly that it can fall considerably below 655° before the particles have had opportunity to move into their permanent or cold position. Hence, the potential heat is still in them, and hardening occurs to the same degree as though the sensible temperature was higher, because of the time lag. The capability of hardening is thus shown to be a function of molecular arrangement, not of heat. Hardening seems to be dependent on temperature, only because the latter is the best means of bringing about the favorable molecular condition.

The following curve, Fig. 7, shows the behavior of a small wire when cooling. The temperatures were estimated by the eye, taking Roberts Austen's recalescence point as 655°.



Curve of Cooling.

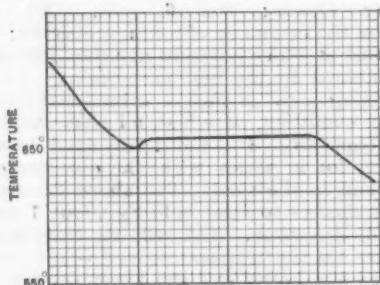


Fig. 6.—Curve of Cooling.

I, temperature at which cooling begins. C, lowest heat attained by the wire and point at which recalescence begins. A and B, recalescence fully established and ended respectively. For this small wire, hardening can occur by sudden cooling anywhere from I to B on a cooling curve. A large piece of steel would not harden below 655°, because that part of the curve I' C A could not exist for it.

Mr. Metcalf has previously called attention to four well marked states in the thermal history of a cooling mass of steel. First, the liquid condition. Second, the granular state, when it is neither crystalline nor plastic nor ductile. Third, the plastic state, and fourth, the crystalline or solid. The change from the plastic to the solid state occurs at the recalescence temperature, and it is the reproduction of the crystals on cooling, with perhaps a change in the relation of the carbon to the iron, which causes the evolution of heat that is manifested as recalescence. A similar change, but less in amount, occurs in some of the alloy steels. It is said that nickel steel containing 25 per cent. of nickel is not magnetic at ordinary temperatures, and is relatively soft and ductile; but if it is cooled to -4° F. it suddenly becomes magnetic with simultaneously a marked increase in tensile strength and a lessening of ductility.

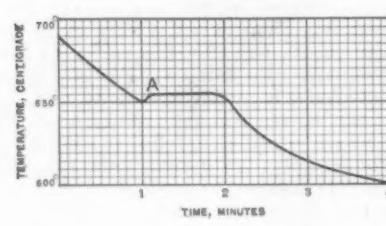


Fig. 5.—Curve of Cooling.

sults laid off as in Fig. 5, there will be an abrupt arrest of the descending pointer at one spot, marked A in the figure, as though the cooling had been stopped. This is the point of recalescence, which is at 655° C. according to Roberts Austen.

Mr. Metcalf offers the following working hypothesis, with which I am in accord:

The solution of carbon in steel above the recalcitrance point is practically perfect unless the dose of carbon is very large. At the recalcitrance point and below it the excess of carbon tends to crystallize out; hence, very rapid cooling of the steel is necessary to retain it in solution. Also, the formation of large crystals is prevented, only small ones being produced, and forming the refined grain. This disturbance of the crystalline forces results in violent molecular stresses which produce hardness, for it is a familiar fact that cold rolling or hammering of any metal whatever hardens it. The function of the carbon is to so alter the ordinary molecular aggregation of iron that this

carried under the regular billet rate, but will be classed as finished products. Considerable steel skelp cut to size and gauge has, it is claimed, been shipped as steel billets, and in the future this will not be permitted, but such material will have to take the regular tariff on skelp iron.

At the meeting of the Central Traffic Association, which will be held in Chicago next month, this matter will come up for discussion, and it is highly probable that some radical change will be proposed.

#### Points for Commercial Travelers.

The ideal commercial traveler for Mexico is described by Consul Fechet. He "should be a gentleman in manners and address

They should always ascertain, the Consul explains, before soliciting orders in a town, if there is a license tax to be paid. Of late years certain States have imposed a license tax on commercial travelers, amounting in some cases to \$150. It is almost certain that a considerable reduction can be obtained by promptly applying to the town authorities for permission to exhibit samples and solicit orders for a specified time. Samples brought to Mexico by commercial travelers are subject to duty if in such shape as to be salable merchandise. Duties may be saved by allowing the customs officers to cut or deface the samples so as to be unsalable, but still available as a sample with which to solicit trade. Or a bond for double the duties, to run six months, may be arranged, and within the six months samples must be returned to the Custom House and the bond will then be canceled.

#### Supply of Ivory.

Commercial Agent McHarr at Boma, in the Congo Free State, has made an interesting report to the State Department in regard to ivory. He says:

The ivory shows a most remarkable increase and is the most valuable article exported. It all comes from the high Congo, both north and south of the river. Steamers bring it as far as Stanley Pool, and from there to Matadi (250 miles) native carriers bring it on their backs. I have seen in one day 500 carriers come into Matadi, each man carrying a tusk averaging 65 pounds in weight. When tusks weigh 200 pounds, which not infrequently happens, four men carry them. Most of the ivory now coming down is what is known as "dead ivory." Some of the elephants from which these tusks came were killed 100 years ago, and the kings of villages have been storing it, placing the last tusks brought in on top of the pile, and when they required some goods from the coast traders the tusks from the bottom layers were taken. This system has prevailed for years, and it is estimated that there is enough ivory stored in the interior to supply the world for the next century. It is estimated (upon whose authority I cannot discover) that there are still at least 200,000 elephants in Central Africa. The only "live" or new ivory which now comes down the Congo is that procured by hunters attached to the different trading houses. I may add that live ivory commands a higher price than the dead. A state expedition visited a native king some months ago in the interior. Upon leaving the commanding officer presented the King with a uniform coat, cocked hat and a sword. The King in return presented the officer with 150 tusks of ivory, averaging 220 pounds each, and provided carriers to take them to the river. These people do not recognize the value and laugh at the trader for buying. Some of these kings have stockades of ivory built around their dwellings.

The Sheffield newspapers say that there is little doubt that the admiralty will use the Harvey armor plate in new war ships. The final decision will be considerably influenced by the latest experiments, but as the Sheffield *Telegraph* frankly admits, it is clear that so far the American invention has achieved the greatest success in armor resistance to projectiles ever known. There is to be another trial in England for the purpose of confirming the first impressions as to the value of the process.

The New York Rapid Transit Commission having failed to sell its tunnel franchise, it is said, immediately proceed to devise an elevated structure.

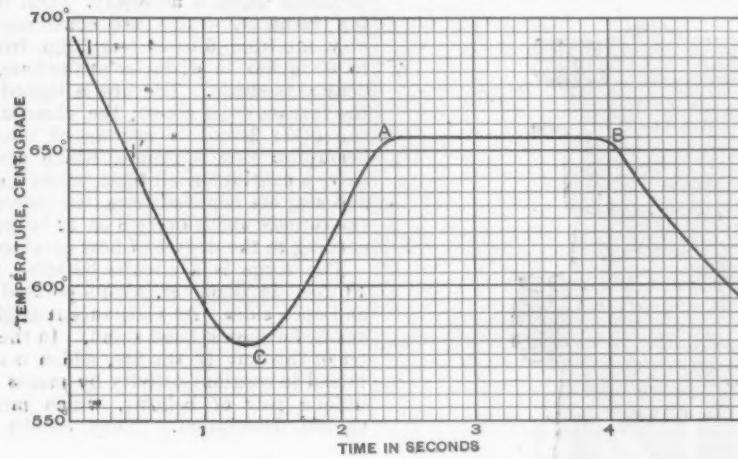


Fig. 7.—Curve of Cooling.

strained grouping can be brought about within easily managed temperature limits.

Similarly, annealing is a partial throwing out of solution of the carbon previously dissolved.

The hardening or chilling of cast iron follows the same general law, only, owing to the greater amount of silicon and carbon present, the cooling must take place from the liquid condition.

To the above I would add this: The relation of carbon to melted iron is one which lies very near the border line separating typical chemical combinations from typical solutions, if, indeed, any such separation exists. Hence, the customary terms, framed to denote one or the other of these states, do not adequately express the shades of difference belonging to the actual phenomena.

**What Is a Steel Billet?**—Recently a number of freight agents of Pittsburgh, representing lines leading to and from that city, in connection with similar committees from Wheeling and Youngstown, met in Pittsburgh for the purpose of taking up the question of what constitutes a steel billet. It is stated that manufacturers in Pittsburgh and elsewhere have for a long time past been shipping skelp iron, merchant steel bars, and other iron and steel manufactures as steel billets, thereby securing quite a material reduction in rates charged for finished iron and steel. Considerable complaint on this matter has been manifested by iron and steel manufacturers in the Mahoning and Shenango valleys, and it was in answer to these complaints that the freight agents of the various roads finally decided to take the matter up in order to obtain information on the subject. The committee visited a number of Bessemer plants in Pittsburgh, Bellaire, Wheeling and other places. While no official information has been given out as to what action will be taken in the matter, it is reported that hereafter billets less than 4 x 4 inches will not be

and should speak Spanish fluently. The Mexicans are a polite and formal people in their counting houses, as well as in their homes, and often do not understand the more familiar manners of other nations. Politeness, patience and tact, joined to a full trade knowledge and ability to speak Spanish, will sell goods in Mexico. Goods are not sold in Mexico in the quick way of our own country; several days of chat and social intercourse often precede the closing order for a large bill of goods. Many questions must be asked and clearly answered; this is especially true when the Mexican buyer knows but little of American goods, and this ignorance is unfortunately but too common. As to the questions to be answered, the commercial traveler must know the weight, size and all the subdivisions his goods may present; manner of packing, sometimes the measurements (cubic or square), rates of freight from the United States to the town where he offers them for sale, customs duties, rates of exchange or difference in value between Mexican and United States money. In other words, he must be prepared to figure at short notice how much the goods he would sell will cost, laid down at the door of his customer, making proper allowances for possible additional customs charges, brokerage and municipal taxes. The commercial traveler able to figure quickly, within a few cents one way or the other, the cost of his goods delivered will get the order in preference to another man who when asked, "What is the rate of freight, of exchange, the weight, the duty, packing, &c.?" can only answer, "Don't know." Every merchant worth dealing with in Mexico keeps a "book of costs," in which he has figured the cost prices of all his goods; and he can tell you very quickly how much the same article has cost him at different times, from different sources, and at different rates of exchange."

Here is a pointer on Mexican methods for the benefit of commercial travelers.

### Gyratory Rock and Ore Crusher.

The National Machinery Company of Tiffin, Ohio, have placed on the market the new ore crusher here shown. It will be observed from our engraving that the top or hopper is entirely open, and this permits the dumping of whole carloads of stone directly into the machine.

The belt is applied to the heavy cast-iron band wheel or pulley, which is attached to a brake hub by means of two common machine bolts, the brake hub only being keyed to the horizontal counter shaft. The band wheel would revolve loose on the shaft were it not held by the two bolts to the brake hub; this is the safety device to guard against the destruc-

and eccentric revolve the upright shaft will receive a gyratory motion (not a rotary motion), and the crushing head will then gyrate within the chilled iron liner or concave, which is fitted within the outer shell so that it may be raised or lowered by means of the jack screws on the outside of the machine. This will regulate the size of the product and also take up the wear on the head and liner.

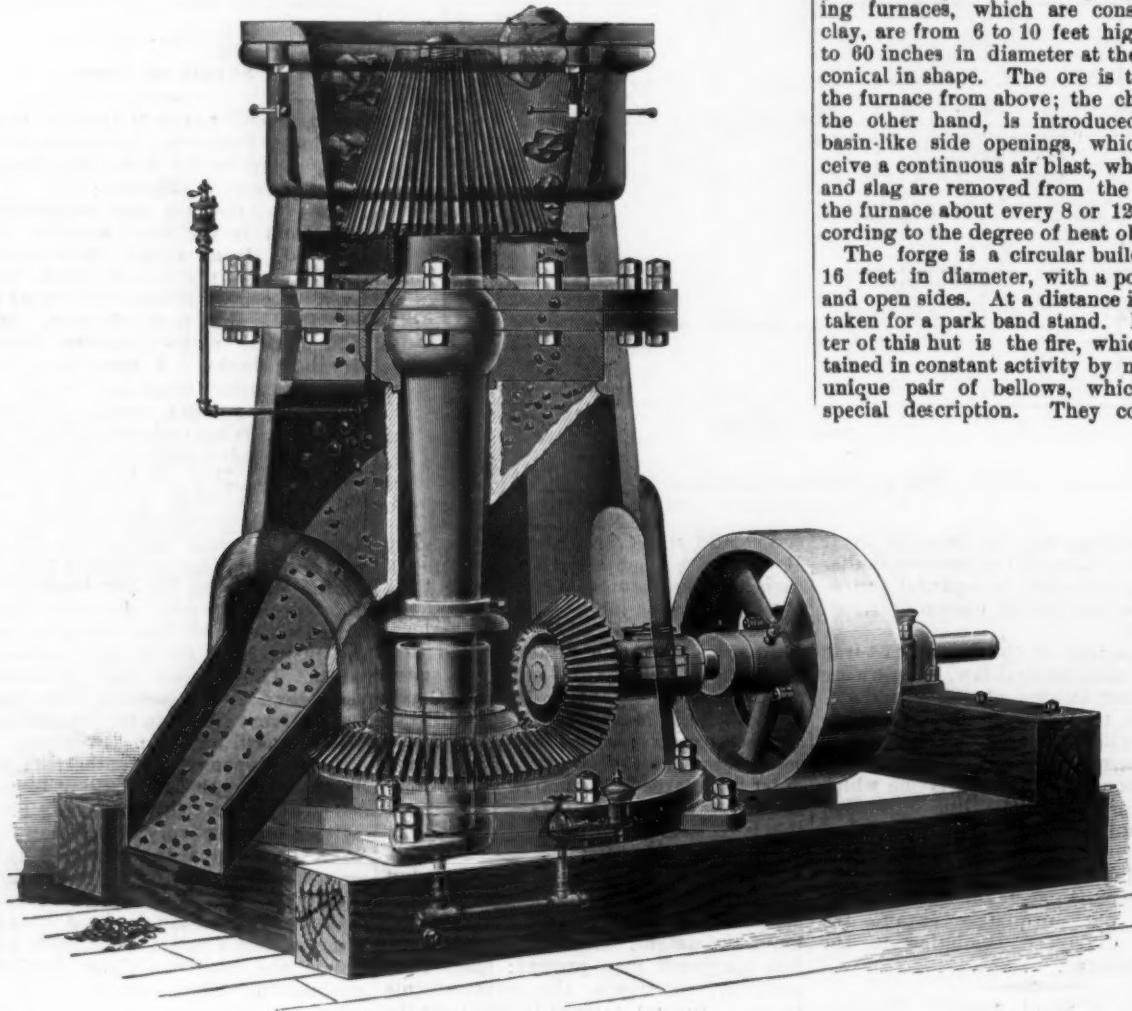
The crushing head has the greatest motion at the top and the least motion at the bottom. This movement produces a most uniform product, spaws not being able to pass through without being broken. This crusher is adapted for fine crushing, as the crushing head can be set up very close to the inside liner or concave, there being very little motion at this point. Provision

feet, is nearly twice that of the largest gun owned in this country, which is 45 feet long. Special cars are being constructed by the Pennsylvania Railroad Company to carry the exhibit. The cars will be entirely of iron. One of them will be placed on 32 unusually large and strong wheels.

### Native African Ironmasters.

The Balubans, as the natives of the Dnausanyomma district of Central Africa are styled, says London *Iron*, enjoy an excellent local reputation as ironworkers. They find their crude material in the form of bog iron ore on the surface of the land. It rarely happens that digging to an appreciable depth is necessary. Their smelting furnaces, which are constructed of clay, are from 8 to 10 feet high, from 40 to 60 inches in diameter at the base, and conical in shape. The ore is tipped into the furnace from above; the charcoal, on the other hand, is introduced into the basin-like side openings, which also receive a continuous air blast, while the iron and slag are removed from the bottom of the furnace about every 8 or 12 hours, according to the degree of heat obtained.

The forge is a circular building, some 16 feet in diameter, with a pointed roof and open sides. At a distance it might be taken for a park band stand. In the center of this hut is the fire, which is maintained in constant activity by means of a unique pair of bellows, which merit a special description. They consist of a



GYRATORY ROCK AND ORE CRUSHER.

tion of valuable parts of the crusher by careless workmen allowing steel sledges or crowbars to drop into the hopper. Should the crushing head come in contact with anything of an unbreakable nature, the strain would become so great at the pulley that the bolts would be stripped of their threads and allow the pulley to revolve freely upon the countershaft. To the countershaft is attached the pinion which drives the large gear in the bottom, and to this large gear is attached a brass eccentric bushing, the throw of which varies from  $\frac{1}{4}$  inch to  $1\frac{1}{2}$  inches according to size of the machine. The lower end of the heavy upright shaft rests within this eccentric and gyrates with it. The upright shaft is suspended in the center by means of the ball and socket below the crushing head, the center of the ball being the fulcrum. To the top of this upright shaft is attached the crushing head, made of very hard chilled iron. As the gear wheel

has been made for easily renewing the wearing parts, and new heads can be put on without removing the upright shaft, and the liner, when worn out, can be lifted out of the machine and a new one put in in a few minutes. The bearings are protected from dust, and lubricated by sight-feed oil cups on the outside. The oil for the eccentric is forced through the pipes by means of a hand pump. The machine is heavily built throughout and well proportioned to stand the heavy strains it is subjected to.

The Maryland Steel Company's enormous shear legs at the marine works at Sparrow's Point are nearly ready to receive Krupp's 124-ton gun, to be exhibited at the World's Fair. The hydraulic mechanism by which the shears will be worked is complete. It is said the gun will cost nearly \$500,000. Its length, 87

block of wood, generally 20 inches long, hollowed out and fitted with a funnel head made of clay. At the lower end are two orifices, over which skins are stretched. Motion is imparted to the instrument by the action of two small rods. The hammer is of solid iron; the tongs are marvels of simplicity—to wit, a bent palm branch. An iron wedge driven into a timber hole serves as an anvil.

The recollections of the Balubans carry them back to the time when they wrought metals with stone tools. Some of the natives are comparatively artistic workers. Very fine axes, tastefully inlaid with copper, are produced. Strikes among these swarthy artificers, it should be noted, are of comparatively rare occurrence, probably owing to the fact that the malcontents invariably have their heads lopped off and their skins placed on one side for patching, or, in case of need, entirely re-covering, the aforesaid curious bellows.

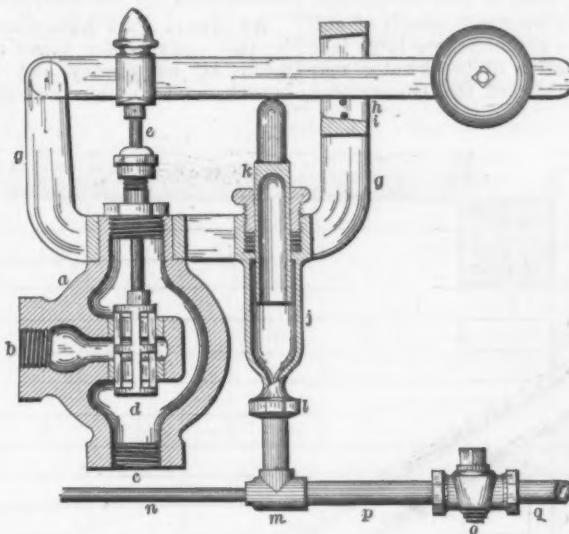
**The Johnson Steam-Pump Governor.**

It is claimed by T. M. Johnson of New London, Conn., the manufacturer of the governor illustrated, that it is as positive in its action as a steam engine governor. The speed of the pump is controlled by the work being done indicated by the water pressure, and is uniform at all boiler pressures. It is further claimed that the governor is durable and not liable to get out

the pump to keep it moving. If the pin is not inserted in the hole *i*, then upon failure of the pump to draw the lever will drop to the bottom of its slot, closing the steam valve and stopping the pump.

**The Riehlé Screw-Power Testing Machine.**

The arrangement and construction of this machine, which is built by the Riehlé



THE JOHNSON STEAM-PUMP GOVERNOR.

of order, as there are no springs or diaphragms.

The body *a* of the valve is connected to the steam pipe from the boiler at *b*, with the throttle or starting valve between it and the casing. The body is also connected to the steam chest of the pump by a pipe connection at *c*. The weight on the end of the lever is adjusted to equalize the friction of the moving parts so that if the lever and water piston *k* are raised their full stroke the weight will be just sufficient to return the parts to their lowest point.

The slot in standard is of such length that when the lever is at either end of its movement the steam valve *d* will be entirely closed, thus cutting off steam from the boiler to the pump at either position, as will be referred to later on.

By inserting a pin in the hole *h*, the lever resting on it will hold the steam valve *d* in a central position or full opening, as shown in the cut, so as to admit a full head of steam to the pump.

The standard *g* swivels on the head of the casing, thus allowing for adjustment to suit the pipe connections.

The pipe *n* is connected to the water discharge pipe as near the pump as possible, and through the tee *m* to the water-pressure cylinder *j*.

The overflow pipe *p*, and overflow valve *o*, are connected by the pipe *q* to the suction near the pump.

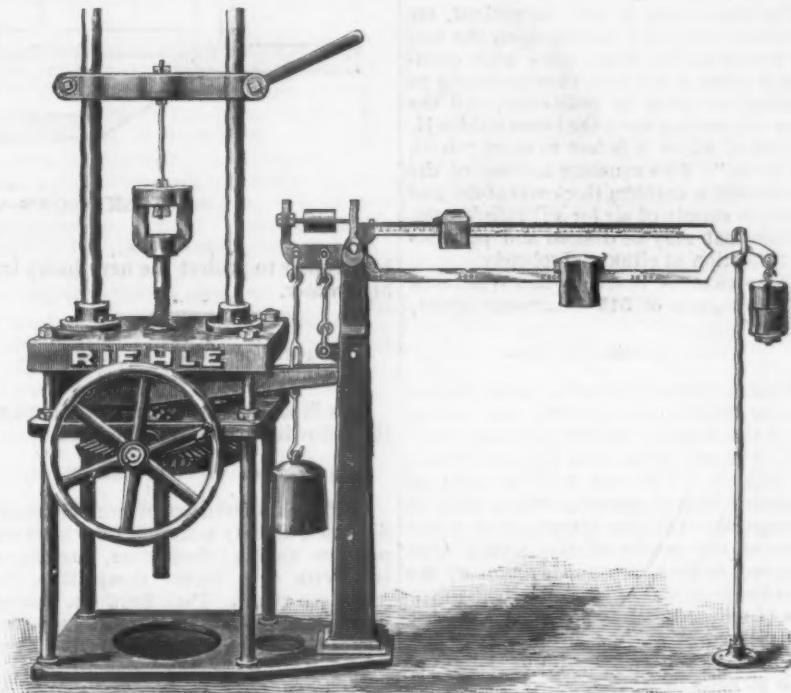
In order to start the pump the valve *o* is opened and a pin is inserted in the hole *h* with the lever resting on it. The throttle valve is then opened. When the pump has started the valve *o* is closed to such a point as will permit a pressure of water in the cylinder *j* sufficient to raise the piston *k* and lever, thereby admitting enough steam through the valve *d* to run the pump. If there is danger of the pump, while at work, losing its suction, the pin is changed to hole *i*, when, if the pressure below the piston *k* is lost through failure of the water supply, the lever will drop to the pin, thus nearly closing the valve *d* and allowing only sufficient steam to pass to

Bros. Testing Machine Company of Philadelphia, are so simple as to require but little description. The machine was made for Waldo & Stout of Bridgeport, Conn. It is capable of testing wire or any mate-

within 5 pounds. The upper bar of the double weighing beam is marked as fine as 2 pounds, the lower one having 1000 pound notches. A testing machine of this character can be used for making a variety of strains and is adapted for use in works where wire or similar material is either manufactured or purchased.

A letter from Amoy speaks of the advantages which Americans might gain by trading directly with that and other ports in China. The imports and exports of the province through the five treaty ports, Amoy, Tamsui, Tainanfoo and Foochow, which are situated within its boundaries, and Swatow, which is just beyond its limits, aggregate \$60,000,000 annually. Amoy is the sole good harbor, so that the foreign commerce of the province may be said to be still in its infancy. For this reason labor is extremely cheap, cheaper than at Hong Kong or Shanghai. The rich importers, jobbers and wholesale grocers will leave no stone unturned to prevent a course of action that deprives them of a large and lucrative business. If any merchant desires to experiment, he can open correspondence with any one of the Amoy tea hongs. These are five in number, viz.: Lapraik, Cass & Co., Tait & Co., Boyd & Co., Jardine, Matheson & Co., Brown & Co. These are all first-class firms, of great business ability and character and standing. China wants flour, kerosene, canned goods, machine-made nails, &c. What is needed is reciprocity.

The Elmira Bridge Company of Elmira, N. Y., has shipped to the Rome, Watertown & Ogdensburg Railroad, for a bridge near Ogdensburg, the longest girders yet made. They are each 123 feet long, 9½ feet deep and weigh 46 tons. They stood on the cars 14 feet 9 inches above the rail. Seventeen cars were used in the transpor-



THE RIEHLÉ SCREW-POWER TESTING MACHINE.

rial of from 8 inches to 3 feet or longer, as desired. The extreme height of the apparatus is 8 feet, extreme length 6½ feet, extreme width 2½ feet, and weight about 1200 pounds. It is operated by hand, but can be arranged to be run by power if preferred. The beam and weighing levers are sensitive, and the test can be weighed

tation of the bridge in one train. One car carried the lateral bracing, field rivets, &c.

The Rhode Island Perkins Horse Shoe Company have declared a quarterly dividend of 1½ per cent. on their preferred stock and 2 per cent. on their common stock, both payable January 14.

### Wilkinson's Automatic Stoker.

When this stoker is applied to boilers of the horizontal tubular type, the "front" situated below the bottom line of the boilers and carrying the ordinary fire doors, ash pit door, &c., are entirely discarded, as are the grate bars, bearer bars, &c.

The stoker iron work is bolted to the remaining upper half of the boiler front. The stoker front, the coal feeding and the grate-moving mechanism are secured and supported by heavy cast-iron "side frames," one at either side of the furnace, extending back to the "girder frame bearer bar," or blast box, B, and secured thereto.

In front of and below the flue cleaning doors a large iron hopper, C, is attached to the stoker front, extending across the same, its length being equal to the width of the grate, and its capacity varying from two to six bushels of fuel, or larger if desired. The fuel is deposited in this hopper and is fed to the furnace by the pocketed feed roller D in measured quantities on to the front end of the grate bars A, and by the slow reciprocating motion of the bars, which is obtained by the eccentric shown, the entire body of incandescent fuel is carried down toward the ash well E, where it is deposited after having been completely burned on the inclined grate.

The accumulated ashes in the well E are removed by the pocketed rotating grate O, keeping at the same time a perfect seal between the ash pit and combustion chamber of the furnace, and preventing entirely any inrush of cold air.

The grate bars are constructed at an angle of 80° from the horizontal and form a series of "steps," with a tuyere opening on their face, through which the admixture of air and decomposed steam is injected into the fire, producing a very intense heat by supplying the peculiar elements of combustion that cannot be supplied in any other way.

The grate bars, it will be noticed, are "hollow," one end resting upon the hollow bearer bar (or blast box) with openings or ports in the bars corresponding to openings or ports in bearer bar, and the other end resting upon the lower saddle H, on both of which it is free to move "back and forth." This constant motion of the bars insures a uniform thickness of fire and an ample supply of air for any rate of combustion that may be desired and prevents the formation of clinker absolutely.

This stoker is made by the Wilkinson Mfg. Company of 515 Commerce street, Philadelphia.

What is claimed to be the largest freight car ever built in this country was turned out of the shops of the Pennsylvania Railroad Company at Altoona, Pa., on Friday, the 30th ult. This car will be used to transport from Sparrow's Point, Md., to Chicago the 124 ton cannon now being made at the works of the Krupp Gun Company in Prussia for exhibition at the World's Fair. The car practically consists of two cars with eight pairs of wheels each, joined by an iron bridge, thus presenting the appearance of one long car with 16 pairs of wheels.

The Pittsburgh Plate Glass Association held a three days' session in Cleveland, Ohio, last week. One of the subjects under discussion was the probable abolition of the tariff on plate glass by the incoming administration. It is said the association will make a vigorous effort to prevent the Democratic Congress from reducing the tariff any more than can be avoided. The plate glass industry has now become one of great importance in this country, and the feeling is general

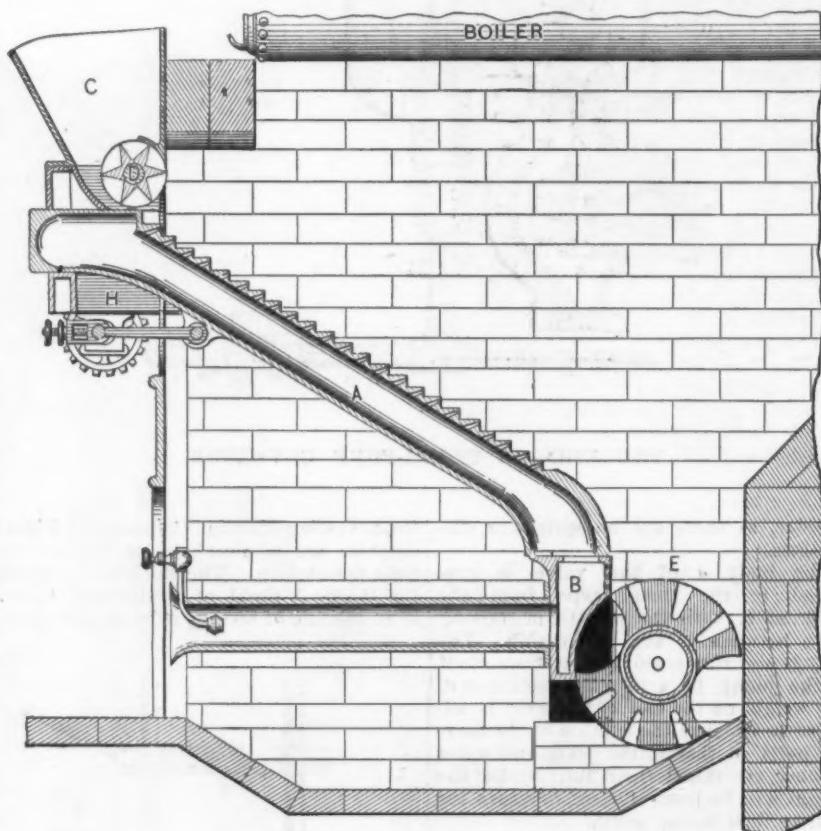
among manufacturers that it will be destroyed if the tariff is lowered. It was stated, however, that there will be no advance in prices on account of the apprehension and that none of the furnaces will be cooled at present. The sessions were secret.

Plans are being perfected by capitalists representing large transportation interests between New York and the West for improvements on the water front at Buffalo, which will cost \$20,000,000. Besides building docks, trestles and warehouses, it is proposed to construct canals of sufficient depth to accommodate large lake vessels, and a section of breakwater may be extended out toward the Government

tons of steel billets has arrived in London, and that arrangements have been made with a local rolling-mill company to roll the steel as desired. The consignment is described as the very best crucible steel that can be made, and the price is 1s. 2d. per lb. Protected by their high tariffs, Messrs. Park are able to obtain such splendid prices for their steel at home that they can afford to send their surplus make to Sheffield and sell it at a loss in the hope of winning trade."

*The Ironmonger* has looked into this matter with the following results:

As Messrs. Park have been represented in this country for some time, first by means of an agency and latterly by a branch house under their direct control,



WILKINSON'S AUTOMATIC STOKER.

breakwater to protect the new docks from high water.

### American Steel in England.

In a Sheffield newspaper a few days ago the following paragraph appeared :

#### American Steel for Sheffield.

"The manufacturers of crucible steel in Sheffield, already suffering from keen competition among themselves, are threatened with even fiercer competition from American rivals. Park Brothers, Pennsylvania, are among the most successful makers of crucible steel in the United States; and more than one or two men have gone from some of the best steel houses in Sheffield to work for Messrs. Park, carrying with them, of course, the practical skill and technical knowledge they had gained at home. As there is not a sufficient demand in America for all the steel Messrs. Park produce, they have decided to send their surplus output to this country, and especially to Sheffield. Indeed, they have indulged in the truly Yankee boast that the time is not distant when they will have monopolized the steel trade of this steel center. We are informed that the first consignment of 200

one of our staff waited upon Barthold Bernheim, who is in charge of the London House, and was courteously permitted to ascertain the opinions of that gentleman upon the points at issue. Having read the paragraph, Mr. Bernheim first smiled, and then said, "You may tell all your friends in Sheffield that they need not be alarmed, for, so far as our sending steel into this country is concerned, we are doing practically nothing. We have introduced a certain quantity into one or two large establishments, but not to any extent."

"May I ask why you have an office in London?"

"The reason is that we lay ourselves out for the export trade, and, as many colonial indents float through London, it has been deemed desirable to have a branch house here. So far from our doing business in this country, I may tell you that our turnover on that account would not pay our office rent. That we might have done a good business here I am not prepared to deny, but it would have been on conditions which we consider peculiar, to say the least. The proposition was (and it was made to us from four different quarters) that we shoud send our crucible steel billets from the States into this country, let them be rolled into bars in Sheffield, and then to be sent out as

'Sheffield' steel, the object of the suggested arrangement being the overcoming of the difficulty which would be sure to arise if the steel was sold under its proper name. Such a proposal we would not entertain for a moment."

"Practically, therefore, we may take it that your firm are not sending steel for consumption in this country?"

"That is so; and as to the paragraph generally, I may tell you that the only truthful portion of it is that which relates to our position as crucible steel makers, for I think we may legitimately pride ourselves upon the fact that we are not only the largest producers, but that we turn out a quality second to none, thanks to the facilities we enjoy, natural gas not being the least of them."

"Then we may take it that the statement as to the price per pound is equally incorrect?"

"Certainly you may, for that is even more absurd than the other remarks. I should very much like to sell 200 tons of billets at 1 shilling 2 pence per pound, or anything like that price. The best steel, known as the 'self-hardening,' I will venture to say, is not sold in any large quantity, the annual sale not exceeding 100 tons, and the price ranges from 10 pence to 1 shilling 3 pence per pound for finished bar. Our idea is not to cut down prices, for we know well enough that in a market like the English no good purpose would be served by cutting rates. Nor do we sell cheaper in England than we do in the United States, nor is it our intention to do anything of the kind; and I may tell you that if the time should come that Park Brothers have to sell their steel at a loss in this or any other market they will close their works."

## THE MESABI IRON RANGE.—II.\*

BY HORACE V. WINCHELL.

### Origin of Mesabi Ores.

In Bulletin No. 6, on the Iron Ores of Minnesota, the idea was advanced that the bands of ore found interstratified with the Taconic rocks of the Mesabi are due to oceanic precipitation as hydrated sesquioxides at the time the sediments were deposited. Subsequent pressure and heat are supposed to have dehydrated the ores and the gabbro outburst to have rendered them magnetic. This idea is still maintained and has been strengthened by recent observations. But it accounts for only one portion of the Mesabi ores. Those original bands of iron were of limited thickness and were interstratified with rock material. The ore deposits recently discovered have none of these rock strata left. They were either never present or have been removed. On page 146 of the report referred to above is also found the following statement:

"We are quite ready at this time to adopt the theory that has been referred to originating with Prof. Edward Hitchcock, and more recently adopted by Prof. J. D. Dana and Prof. R. D. Irving, that these carbonated beds may be changed, and have been, on a large scale in the Taconic rocks of New England and of the Penokee-Gogebic range, by infiltrating waters, that their alkaline constituent has been carried away and their iron has been redeposited or concentrated in a residual condition as ferric oxides, and that by this concentration large beds of iron ore have been formed. It is because of this that we state our belief that possibly important beds of limonite or hematite, originating in this way, may yet be found

in the Taconic region of Minnesota, the parallel of those that have recently been opened up in Northern Wisconsin." This is a partial statement of the theory adopted by the writer for the ore deposits under discussion. From careful personal examination of the work on all parts of the Mesabi during its entire process of development, the idea has become stronger and more firmly fixed in his mind that these deposits are mainly due to chemical alteration and replacement of some mineral by oxide of iron. There is a general harmony of facts and phenomena observed which go to support this idea, and which apparently are not in consonance with any other theory. The usual conditions existent at the different mines on the range, so far as they have been exploited, are the following:

1. There is a deposit of ore situated on some hillside or in some basin.

2. This ore is regularly stratified.

3. The planes of stratification dipping less than 30° pass from the ore into and through the banded jaspery quartzite or taconite horizon in three directions and occasionally on all four sides.

4. The ore strata correspond in texture with the rock strata, which appear to be their continuation.

5. Underlying the ore is usually a quartzite horizon.

6. Just beneath this ore this quartzite is decomposed into a crumbling sandstone, but it becomes vitreous a few feet below.

7. This quartzite is impervious and presents an absolute barrier to surface infiltration. This fact is shown, 1, by microscopic examination of the vitreous quartzite; 2, by test pits sunk into it; 3, by the large amount of surface water in the ore as the boundary between the ore and quartzite is approached. The ore is porous and permits the water to filter through it. Test pits are sunk through dry ore to the depth of nearly 100 feet, where the ore body covers a considerable area, but water in large quantity is invariably encountered a few feet above the quartzite.

Exceptional occurrences which tend still further to prove the replacement theory are: 1. The existence of deposits of half ferrified rocks, with ore in bands and in isolated centers of deposition. In such situations the process of ore production, or natural manufacture, so to speak, can be observed in all stages of progression. 2. The occurrence of knolls of taconite lying on top of the ore deposits, having been above the course of the chemical percolations, and thus having remained unaltered.

It is a fact confirmed by abundant observation that the iron ore occurs precisely at the taconite horizon. It lies neither above nor below it, but in it and of it. It is natural that the process of this transformation into ore should be limited by the local environments. If the angle of the slope down which surface waters have flowed be too steep or too flat there is no resultant ore body; if it is moderate the ore deposit may have been produced to a great depth and width. If the basal quartzite comes to the surface at the upper side of the slope the atmospheric waters appear to have flowed down along the line of separation between the taconite and quartzite. In this case it may happen that the process of replacement extended but a short distance above the quartzite and there may be an unaltered capping of taconite above the ore. If the hillside and top are covered with the jaspery quartzite and banded ore formation the infiltrating waters sometimes seem to have worked a change downward into these rocks and there may or may not be an unaltered remnant of the taconite horizon below, according to the original thickness and the natural facilities for chemical action.

There is even a third case seen on the Chicago property, in which a body of soft ore 9 feet thick has been produced in the taconite formation, and is seen graduating into the hard banded rock on all sides.

The process of replacement is of two or three varieties. Certain strata seem to be more easily ferrified than others; and instances are common where the wavy line of ferruginization is seen encroaching upon the blue or gray unaltered taconite. This may often be followed in a single hand sample from taconite to ore, while the stratification, texture, and often appearance remain the same. The remarkable part of it is that all the original mineral elements have gone and the result is such pure oxide of iron. There is much silica of a chalcocite or amorphous nature in the taconite, and occasionally layers of quartzite; but all these can be observed in the actual process of replacement by iron ore.

On the Cincinnati property it even appears that some of the basal quartzite has been replaced by iron oxide. Samples taken from here show a complete transition from quartzite to iron ore. In some of the intermediate samples the individual grains can be seen in all stages of removal. There are many encased in a shell of hematite, which can be seen increasing in thickness until, on breaking the black grain, no white silica grain is found. It has all been removed. With a specimen of this sort in hand it is impossible to doubt that here is an instance of the removal of silica and its replacement by sesquioxide of iron.

Still another proof is found in the nature of the transition back again from ore to the taconite on the lower edge of the deposits.

This has already been referred to under the head of "Mode of Occurrence of the Ore." If this ore be not a replacement product, it must continue underneath the rocks belonging higher up in the formation and will ultimately be mined to a great depth. There is no absolute proof that this is not so. On the Biwabik and Cincinnati, however, the ore is seen to degenerate and pass into a low grade ore, and then into "paint rock" and finally into the regular banded taconite horizon on the southern edge.

There have been reports of the discovery of soft ore at great depths under the slates to the south of the present deposits, but these reports are not as yet authenticated. Even if they should be at one or two places in the basins of lakes like the Embarrass, it would not weaken the replacement theory; for it is only natural that the effect of a body of water pressing downward through and into a series of soft slates would have some softening, oxidizing and disintegrating effect. The carbon of the graphitic slates would be dissolved and silica removed by it so that replacement deposits might be formed in such a place even at a depth of 500 feet. It should be mentioned, moreover, that the glacial drift exceeds 100 feet in depth on the southeast shore of Embarrass Lake and may be twice as deep in the lake basin. This would make the actual depth from surface influences very much less and increase the likelihood of an ore deposit.

In searching for an explanation of this process of replacement we are met with many puzzling questions, and it is just as well to admit that more study is necessary for their solution. What started this process? How could so much quartz be removed? What has become of it? Where did all the iron come from? These and many other questions have presented themselves time and again.

It has been advocated that the iron ore of the Gogebic range was originally in the form of a carbonate which in the process of oxidation yielded the necessary solvent

\* From the Twentieth Annual Report, Minnesota Geological Survey.

for the quartz. We find some traces of carbonates of lime and iron in the Mesabi rocks, but it does not appear in sufficient quantity to permit the assumption that the ore was originally a carbonate. There are not yet discovered any considerable non-oxidized carbonaceous portions of the rocks associated with the ores, except in the more recent slates of the Animikie, which are now found further south. It does seem probable, however, that the solvent for the silica was carbonic acid in aqueous solution, and its early source may have been: 1, the atmosphere; 2, the black slates, which may have covered the ore horizon at one time and have since been eroded; 3, more recently decaying vegetation must have supplied a considerable amount.

The amount of carbonic acid gas in the atmosphere at the beginning of Silurian time is stated by different writers to have been far greater than at present. It is supposed that the Carboniferous was a period of dense atmospheres and warm temperatures. Dana states that in Archaean time the effects of carbonic acid must have been much greater than now owing to its much larger proportion in the atmosphere, and that it has gradually diminished in quantity up to the present time. He states after Hunt that the excessive proportion of carbonic acid in the atmosphere was the most efficient of all agents in rock destruction (Manual of Geology, p. 156). T. S. Hunt states that "all carbonates of lime, whether directly formed by the decay of calcareous silicates or indirectly through the intervention of carbonates of manganese, or alkalies, derive their carbonic dioxide from the atmosphere. The same must be said for the dolomites, magnesites and siderites, . . . the earth contains, fixed in the form of carbonates, a quantity of carbonic dioxide, which if liberated in a gaseous form would be equal in weight to 100, if not 200, atmospheres like the present" (Min. Phys., pp. 37-38). Here, then, may be the explanation of the removal of silica in such large quantity. If the rocks which produced the present iron ore deposits have been uplifted and exposed to surface action since primordial time, the carbonic dioxide used in the removal of silica must have been derived, at least in part, from the atmosphere. This process would have been carried on to a considerable depth and may have produced an appreciable effect, even below several hundred feet of sediments which may have since been eroded.

But if these iron-bearing strata were ever covered by the slates which belong above them we can find an abundance of carbon in these very black slates, and though it is not now in the form of carbonates, yet the action of surface waters would be such as to extract sufficient to make a carbonic acid solution powerful enough to take iron and silica into solution. Moreover, Hunt says "the removal of silica in soluble form does not depend on the intervention of alkalies." And the carbon in the graphitic Animikie slates may have been at earlier times in some form more readily taken into solution. Having thus hinted at an answer to the first two or three questions which naturally arise in this connection, let us consider another one.

What has become of all the silica supposed to have been removed from the present location of the iron ores?

The answer to this is short. It was redeposited in the rocks lying below and further down the slope. 1. There is need of a source for an enormous amount of silica which has been added to the grains of quartz in the quartzite, making it vitreous and filling all interstitial spaces. 2. There are considerable amounts of chalcedonic and flinty silica found associated with the quartzite and in the other rocks associated with the ores. This silica may

be largely from a different source, but it may be partially derived from the leaching of the ore beds. 3. There are deposits of silica in all the cracks and fissures of the slates which lie at a lower elevation, but stratigraphically above the ore horizon. Test pits, for instance, on the Rouchleau, south of the Biwabik, encountered black slates and found no ore. These slates had been more or less jointed, and the joints were filled by a bluish silica, sometimes mammillated, sometimes drusy. It is apparent to an observer that the most natural source for this silica is in the ore deposits further up the hill to the north. Future researches will throw more light on this subject, and will perhaps show other ways in which the removed silica has been redeposited.

As for the source of the iron, it is believed to have been largely the result of oceanic deposition, both chemical and mechanical, and to have been simply concentrated in its present situations.

There was also a removal of iron in solution. It was brought down to supply the places whence the silica was taken. These solutions followed the natural drainage courses. Elevation of the strata produced general jointing. The rocks on top of an elevated knoll were cracked full of joints, and the waters had free and abundant opportunity to percolate downward even in some places where the slope was not sufficient to accomplish it otherwise. The iron now being mined may formerly have been disseminated through rocks now completely removed by erosion.

#### Quality of Mesabi Iron Ore.

For some unknown reason the opinion prevailed for several months after the discovery of many of the best mines on the range that the ore was of inferior quality. This may have been due to false reports purposely circulated by those who had no desire to see a new range discovered and exploited in competition with the mines in which they were interested, or it may have been due to honest but incorrect sampling. Each addition to the family of Lake Superior iron ranges is received more unkindly by the older brothers and sisters. Dame Nature seems to have bestowed her best favors on her youngest children. The Vermilion, Gogebic and Mesabi ranges have each in turn revealed newer and greater riches. It was with extreme reluctance that the proprietors of mines in other districts recognized the importance of the Mesabi. Indeed, they have not yet done so, nor will they until next year, when the ore finds its way to the markets and furnaces of the East.

It is true that the first test pits were sunk on the thin upper edge of the ore, and the upper strata are not so rich as those lower and farther down the slope on which the deposits lie. The analyses first obtained, however, were sufficient to convince an unprejudiced person of the importance of the new district. The average of a large number of samples taken in January and February, 1892, indicated that the ore would yield about 60 per cent. metallic iron, and that 75 per cent. of it would be within the Bessemer limit as to phosphorus. Since then the test pits have been increased in depth and number, and the quality of the ore taken out has improved, as will be seen from the analyses which follow. There has been still further improvement since these samples were taken.

The following table of analyses does not do full justice to all of the mines represented. The Berringer, Canton, Lake Superior, Lone Jack and New England have already made developments showing a higher grade of ore, and there is no doubt that some of the others will improve with further development.

#### Analyses of Mesabi Iron Ores.

##### Berringer Mine.

Pit number.	Iron.	Silica.	Phos.	Mang.	Comb. Water.	Free Water.
0.	57.50	10.33	0.108	...	...	...
4. First 10 feet.	60.70	...	0.069	...	...	...
4. Dump.	62.15	...	0.049	...	...	...
4. Dump.	63.10	...	0.032	...	...	...
7. Ocher.	61.90	...	0.051	...	...	...
7. 60 ft. ore.	59.20	4.41	0.111	...	...	...
4. 35 ft. ore.	62.60	3.58	0.049	...	...	...
Average..	60.97	6.05	0.067	...	...	...

##### Biwabik Mine.

1. Dump..	55.55	9.77	0.107	...	6.64	12.21
1. 22 ft. ore.	58.25	4.49	0.112	...	7.05	6.63
2. ....	60.32	5.07	0.121	0.37	...	5.37
9. ....	61.95	2.92	0.090	...	6.48	7.50
11. ....	61.05	4.42	0.075	...	5.35	2.08
11. ....	61.44	3.59	0.075	0.17	...	6.38
11. ....	61.60	4.01	0.075	0.957	...	...
11. ....	59.30	8.57	0.075	...	...	...
11. ....	61.58	4.07	0.058	0.16	6.48	5.50
11. 58 ft. ore.	61.95	2.92	0.022	...	...	2.50
13. ....	55.25	7.36	0.039	...	6.25	11.86
15. Blue ore.	66.50	1.57	0.015	0.21	...	...
15. Upper 6 feet.	67.90	1.23	0.010	...	...	...
15. Lower 10 feet.	66.80	2.04	0.012	...	...	...
15. Whole pit.	64.30	3.20	0.038	0.340	...	...
15. Blue ore.	66.70	1.84	0.022	0.442	...	...
15. Brown ore.	63.90	3.35	0.047	0.587	...	...
15. Red brown.	62.90	2.59	0.045	0.331	...	...
15. Selected.	68.15	1.025	0.011	...	...	...
15. 30 feet blue.	67.00	1.80	0.016	...	...	...
15. *Drift.	64.40	4.38	0.027	...	...	...
15. *Drift.	65.80	...	0.034	...	...	...
15. Brown blue.	65.90	2.70	0.042	...	...	...
15. First 20 feet.	67.50	...	0.010	...	...	...
15. Last 16 feet.	61.85	...	0.057	...	...	...
15. 30 feet blue.	63.20	...	0.082	...	...	...
15. First 10 ft. drift.	67.25	1.88	0.010	...	...	...
15. 0-20 feet drift.	67.00	...	0.020	...	...	...
15. 20-30 feet drift.	65.80	...	0.034	...	...	...
15. 30-40 feet drift.	66.20	...	0.039	...	...	...
15. 40-50 feet drift.	66.00	...	0.038	...	...	...
15. 70-80 feet drift.	66.50	...	0.015	...	...	...
15. 80-90 feet drift.	66.00	...	0.012	...	...	...
15. 90-100 ft. drift.	66.00	...	0.015	...	...	...
15. 100-110 ft. drift.	66.20	...	0.018	...	...	...
15. Dump.	65.850	2,450	0.022	0.100	2.2	...
17. ....	63.25	...	0.056	...	...	...
17. ....	68.60	...	0.060	...	...	...
17. Brown.	63.40	5.04	0.033	...	...	...
17. 97-107 ft.	64.15	...	0.023	...	...	...
17. 67-77 ft.	64.00	...	0.026	...	...	...
17. ....	63.25	...	0.056	...	...	...
17. 72 ft. ore.	65.34	...	0.035	...	...	...
17. 63 ft. ore.	67.20	1.27	0.017	0.190	2.00	...
15. 30 ft. ore, 56 feet deep.	64.20	2,070	0.054	0.110	5.00	...
19. 18 ft. hard ore and soft ore 80 1/2 ft. down.	66.25	1.63	0.034	0.250	2.70	...
19. 2 1/2 feet brown ore at bottom.	64.75	1,450	0.072	0.200	5.67	...
20. First 1 1/2 feet.	62.60	5.83	0.064	...	...	...
20. 15-25 ft.	62.40	...	0.068	...	...	...
21. First 1 1/2 feet.	50.85	...	0.007	...	...	...
21. 15-25 ft.	63.50	...	0.063	...	...	...
21. ....	57.40	11.04	0.063	...	...	...
23. Blue ore 7 feet from bottom.	67.35	1.85	0.015	0.130	1.10	...
24. Bottom ore.	64.050	1.71	0.027	0.240	4.88	...
25. Dumb ore just under surface.	63.45	2.85	0.028	0.370	4.6	...
26. 37 feet at base.	65.50	1.73	0.049	0.060	3.3	...
26. 5 feet at bottom.	66.40	1.63	0.043	0.080	2.4	...
26. Blue ore at base.	63.25	2.75	0.042	0.300	3.1	...
Average.	63.70	3.46	0.0455	0.284	3.01	6.76

\* From 150 foot drift at depth of 65 feet.

Canton Mine.						
3.	57.22	7.47	0.083	.....	.....	9.50
North pit.	63.13	2.29	0.030	.....	.....	7.65
Yelllow ocher.	60.65	2.00	0.105	.....	8.04	9.88
20 ft. sur., 45 feet ore.	59.15	4.31	0.048	.....	9.21	10.22
Yelllow ocher.	60.90	4.85	0.029	.....	10.05	.....
Average.	60.21	4.20	0.050	.....	9.10	9.307

Cincinnati Mine.						
1. Poor ore.	54.85	15.06	0.026	.....	2.35	8.00
2.	59.95	8.85	0.022	.....	3.16	8.44
3.	60.10	8.60	0.040	0.475	.....	.....
4.	61.65	5.39	0.031	.....	3.24	4.80
5.	59.80	8.40	0.040	0.497	.....	.....
6.	59.24	10.25	0.046	.....	4.01	.....
7.	62.50	4.89	0.067	.....	.....	.....
8.	63.00	3.84	0.029	.....	5.03	3.16
9.	61.50	4.83	0.029	1.98	.....	.....
10.	63.50	5.37	0.039	.....	.....	.....
11.	Biwabik dump.	59.00	7.65	0.060	.....	.....
12.	57.80	.....	0.088	.....	.....	.....
13.	54.50	14.13	0.028	.....	.....	.....
14.	60.70	8.10	0.034	.....	2.85	10.96
15.	Dump.	58.50	8.90	0.045	5.39	7.55
16.	54.90	16.00	0.040	0.515	.....	.....
17.	54.40	14.13	0.028	.....	.....	.....
18.	54.50	9.08	0.078	0.460	.....	.....
19.	55.70	9.06	0.112	.....	.....	.....
20.	55.10	8.08	0.110	0.810	.....	.....
21.	Dump.	55.75	7.38	0.078	.....	.....
22.	56.80	8.00	0.063	.....	.....	.....
23.	Second from north.	57.20	12.88	0.034	.....	.....
Average.	58.30	8.95	0.0498	0.701	3.67	6.71

## Great Western Mine.

Great Western Mine.						
1.	65.02	.....	0.024	.....	.....	.....
2.	63.71	.....	0.020	.....	.....	.....
Average.	64.36	.....	0.022	.....	.....	.....

## Hale Mine.

Hale Mine.						
1.	61.16	2.89	0.063	0.40	.....	7.05
2.	61.48	3.60	0.088	1.20	.....	.....
3.	61.10	4.32	0.067	0.849	.....	.....
4.	62.10	2.92	0.075	1.29	.....	.....
5.	57.60	5.95	0.077	1.65	.....	.....
Average.	60.67	4.05	0.074	1.071	.....	7.05

## Kanawha Mine.

Kanawha Mine.						
1.	64.45	3.32	0.050	.....	5.29	11.76
2.	60.65	4.90	0.051	0.644	.....	.....
3.	59.60	6.40	0.081	0.754	.....	.....
4.	59.10	7.48	0.084	0.405	.....	.....
Average.	60.95	5.52	0.066	0.600	5.29	11.76

## Lone Jack Mine.

Lone Jack Mine.						
1.	59.415	7.55	.....	0.251	3.05	.....
2. Bottom.	58.565	6.75	.....	0.348	3.15	.....
3.	55.00	9.29	0.096	.....	.....	.....
4.	60.806	4.78	.....	0.775	2.05	.....
5. Bottom ore, dump	60.225	3.716	0.080	0.540	2.08	.....
Average.	58.402	6.417	0.092	0.478	2.55	.....

## McKinley Mine.

McKinley Mine.						
1.	60.32	10.72	0.024	0.770	.....	1.89
2.	61.48	9.27	0.022	.....	.....	1.64
3.	65.60	4.10	0.017	.....	.....	.....
Average.	62.46	8.03	0.021	0.770	.....	1.76

## Missabe Mountain Mine.

Missabe Mountain Mine.						
1.	63.90	3.617	0.051	.....	1.85	.....
1. Upper 10 feet.	56.80	7.20	0.041	5.80	3.30	9.80
1. [?].	62.40	4.80	0.026	0.270	1.78	.....
1. [?].	62.89	3.38	0.061	.....	2.92	.....
1.	65.21	3.83	0.087	.....	2.26	.....
1. 45 ft. ore.	64.03	3.094	0.053	0.387	1.75	6.70
3.	60.05	4.65	0.075	1.080	3.40	.....
3. Dump.	62.33	5.53	0.027	0.840	1.15	.....
4. Top of dump.	61.304	5.40	.....	0.503	5.10	.....
4. Dump.	61.90	3.14	0.080	.....	.....	.....
5. Dump.	56.817	11.967	0.050	0.180	1.76	.....
7.	64.30	4.36	0.077	.....	.....	.....
7.	62.50	4.89	0.087	.....	.....	.....
Average.	61.73	5.066	0.065	0.542	2.52	8.25

## Mountain Iron Mine.

Mountain Iron Mine.						
1. [Old number].	62.43	5.70	0.047	.....	.....	4.15
2. [Old number].	59.12	11.48	0.048	.....	.....	2.74
1. [New number].	65.00	.....	0.052	.....	.....	.....
2. [New number].	62.250	6.820	0.068	0.110	2.50	.....
1.	63.98	0.29	.....	.....	.....	.....
2. 18 ft. ore.	57.68	18.35	0.054	0.130	2.20	.....
3. 14 ft. ore.	64.93	3.70	0.057	0.238	1.88	.....
4.	61.90	5.82	0.048	.....	.....	.....
5.	65.14	4.11	0.048	.....	.....	.....
6.	65.55	4.14	0.057	.....	.....	.....
7.	65.00	3.51	0.033	.....	.....	.....
4. 23 ft. ore.	64.242	4.98	0.035	0.232	2.80	.....
6.	66.52	0.031	.....	.....	.....	.....
4. 18 ft. ore.	59.81	8.66	0.057	0.155	3.99	.....
7.	65.30	3.08	0.053	.....	.....	.....
7. Lammers, Chem..	68.68	6.77	0.041	.....	.....	.....
8. Lammers, Chem..	62.52	2.74	0.031	.....	.....	.....
9. Lammers, Chem..	66.00	2.49	0.046	.....	.....	.....
10. Lammers, Chem..	62.65	5.20	0.056	.....	.....	.....
Average..	68.22	5.64	0.060	0.155	2.674	3.495

## New England Mtn.

New England Mtn.						
3.	63.20	5.07	0.032	.....	.....	.....
3. Pit, last 20 feet.	64.53	4.20	0.047	0.414	1.91	.....
4. 26 ft. ore.	64.45	3.03	0.037	.....	.....	.....
3. Dump, last 20 feet.	61.25	8.788	0.020	0.450	1.48	.....
Average..	63.16	5.34	0.036	0.432	1.695	.....
Average of averages..	61.46	5.92	0.0528	0.607	4.063	6.886

## Comparison with Other Ores.

Until there shall have been a large consumption of the Mesabi ores it will be impossible to tell exactly how they compare in all respects with the ore of other districts. There are high and low grades of ore on all ranges and the average tonnage purity of an entire range has never been determined. By this is meant the average quality of the ore taking into consideration the number of tons of each grade mined. Some idea of the comparative excellence of Mesabi ores, however, can be gained by a consideration of the analyses already given and the actual results obtained in other instances.

The output of the Minnesota Iron Company from the Vermilion range in 1891 is classified in the following table. This ore is well known as some of the finest hard hematite obtainable, and yet only 47 per cent. of the product was Bessemer.

owing average analyses for 1891, and guarantees for 1892:

## Commercial Grades of Ore from Vermilion Iron Range, 1891.

Composition.	Vermilion.	Soudan.	Red Lake.	Minnesota.	Chandler.	Long Lake.
Iron.	67.75	65.96	63.49	68.14	63.91	60.06
Silica.	1.58	2.27	5.00	1.30	5.10	7.20
Phosphorus.	.15	.02	.111	.041	.044	.044
Manganese.	.20	.14	.19	trace	.60	.61
Alumina.	.68	1.80	.90	1.10	2.90	2.87
Sulphur.	trace	trace	.026	trace	trace	.043
Magnesia.	trace	.30	.30	.13	trace	.19
Lime.	1.00	.54	.71	.56	.37	.31
Guarantees:						
Iron.	66.60	65.00	62.00	6		

### Large Steam Cylinders and Their Liners.

Almost all large steam cylinders are now built with inner linings or "working liners," as they are called, which if seriously injured or reduced to a dangerous thinness by successive borings, can be removed and replaced by others without the excessive cost which would be entailed by the renewal of the cylinder itself. This applies most particularly to the cylinders of marine engines, where, by reason of the varying angles at which the machinery operates, consequent upon the rolling of the ship, a perfectly even or uniform wear of the bore of the cylinder is never obtained, and a reboring becomes a not infrequent necessity.

Apart, however, from the economy of this arrangement, as indicated above, there are other very important advantages secured by it. In the first place, it renders the molding of the cylinder very much simpler, and consequently adds enormously to the probabilities of obtaining good castings. It must be remembered that a single cylinder of, say, 100 inches in diameter is

tool would cut into the hollow and prove the ruining defect.

Again, a feature of moment is that the liner, being subject to the rapidly changing temperatures of live steam and exhaust, can expand and contract in its length without distress to the main barrel, and to this point of allowance for expansion much attention has been directed in designing the forms of the liners and their connection to the cylinders. A tight joint must be made between the liner and the cylinder to keep steam from passing from the latter to the jacket, and yet this joint must be a "slip" joint.

Fig. 1 represents probably one of the most common forms of the modern liners. Here the cylinder is bored out on the bearing faces *a a*, and the outer similar faces of the liner turned to the same diameter; then the liner is lightly forced into its place and the bottom flange bolted to the bottom of the cylinder, steam tight. Around the top the "slip joint" is made tight by means of suitable packing and a follower bolted to the liner.

Fig. 2 represents another method of attaching the liner, in which it is bolted to the cylinder at the top circumference, and

for steam cylinders of large dimensions, as well as for the liners. The high grade of intelligence and skill now directing the operations of our large foundries makes the loss of a casting a rare occurrence, and is a source of very great pride to engineers of the United States.

### Track Laid in 1892.

The *Railroad Gazette* reports that the record of railroad construction in 1892 shows that there has been a little over 4,000 miles of new track laid in the United States in that period, or about the same amount of new mileage as was built in 1891. The Pacific Extension of the Great Northern is to be credited with 588 miles of this total, and the track laid on that line in Washington, 351 miles, brings that State to the head of the list of States laying new track. Other long lines built this year are the Sandusky & Columbus Short Line, in Ohio; the Texas extension of the Chicago, Rock Island & Pacific, in the Indian Territory, and the Wyoming extension of the Chicago, Burlington & Quincy. The Pennsylvania

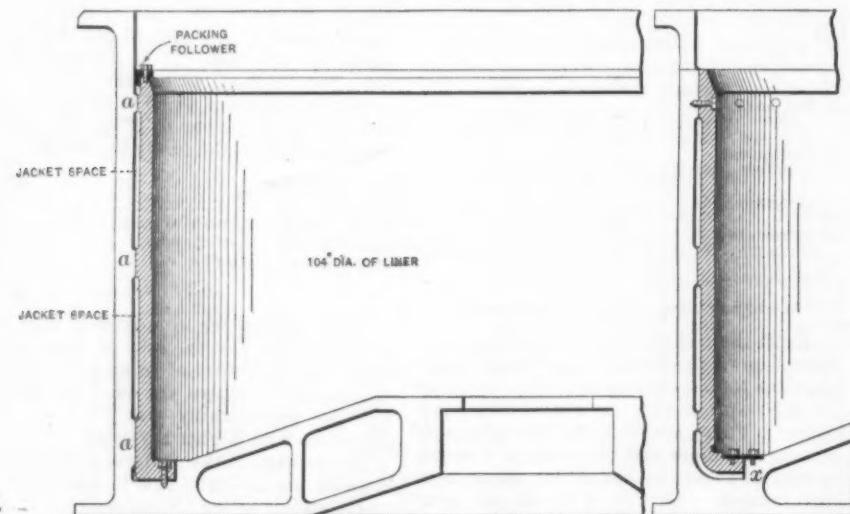


Fig. 1.

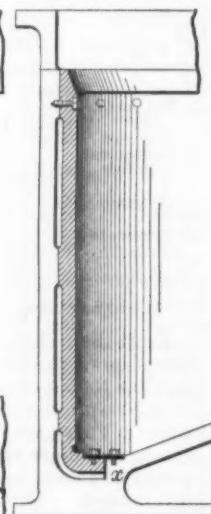


Fig. 2.

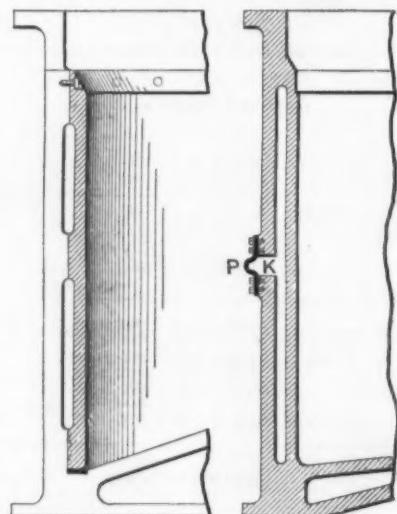


Fig. 3.



Fig. 4.

### LARGE STEAM CYLINDERS AND THEIR LINERS.

not only a mammoth and intricate casting, with its valve chests, ports and bosses, but is also a very expensive one to make, requiring not only many weeks for the construction of the pattern, but something like two months to make the mold in the foundry and get it ready to receive the metal. As this is so, it is easy to realize to what a degree of importance all simplifying features rise, and how a 35,000-pound casting can be utterly ruined by having its design such as to bring over-severe shrinkage strains upon it as the metal cools, cracking the walls or distorting the shape to a useless article. To follow this statement so as to see clearly how much more complicated would be the production of one of these cylinders without the use of the liner, it will be necessary to know that the spaces marked "jacket spaces" in the drawing Fig. 1 are not merely incident to the liner, but are requisite to the cylinder, and would have to be preserved in the single casting. Hence in the molding these annular intervals would have to be represented by cores of such slight thickness and considerable length as to be most difficult to keep properly in place and to remove after the casting, nor could any slight shifting of these cores be positively detected by inspection, until probably when in boring out the cylinder the

the expansion joint made at the bottom by fitting a flat copper ring *x* over the junction of the liner and cylinder, bolting this ring securely to each. The flexibility of the copper permits of slight changes in length of the liner, and keeps the joint steam tight.

Fig. 3 is still another arrangement, where the tightness of the bottom joint is secured by having the liner fit at that point like a water-grooved piston. This is one of the simplest forms and probably the least expensive, as well as quite efficient if primarily well fitted.

Fig. 4 represents a patented device of one of the leading American designers, and is used without liners on land engines, where the wear of the cylinder is very uniform. The opening *K* permits of easy coring, and the U-shaped ring of heavy copper *P* is finally bolted over this and permits expansion without impairing the steam tightness of the joint. This is not a cheap arrangement, but is a most excellent and efficient one for the purpose intended. It does not, however, belong to such cylinders as we are considering, and is only given as an illustration of these expansion joints.

Cast iron of very close grain, and as hard as can be well worked with boring tools, is the material deemed most suitable

Railroad has built nearly 120 miles of new road. Following is the table of new mileage by States:

Alabama	24	New Hampshire	13
Arizona	19	New Jersey	12
Arkansas	20	New Mexico	6
California	82	New York	290
Colorado	15	North Carolina	63
Florida	121	North Dakota	92
Georgia	40	Ohio	200
Idaho	83	Oklahoma	11
Illinois	78	Oregon	15
Indiana	156	Pennsylvania	275
Indian Territory	102	South Carolina	35
Iowa	55	South Dakota	6
Kansas	1	Tennessee	75
Kentucky	23	Texas	222
Louisiana	73	Utah	29
Maine	15	Virginia	30
Maryland	21	Washington	407
Massachusetts	21	West Virginia	201
Michigan	224	Wisconsin	89
Minnesota	189	Wyoming	102
Missouri	238	Total U. S.	4,015
Montana	126		
Nebraska	76		

The American Chemical Society held a three days' session in Pittsburgh last week, during which some interesting papers relating to chemistry were presented by the members. At the conclusion of the session the Homestead Steel Works, the Duquesne Steel Works and the works of the Pittsburgh Reduction Company at New Kensington, Pa., were visited by those in attendance at the meeting.

## The Chicago Iron Trade in 1892.

The year just ended has been more than usually eventful. It opened with excellent prospects in almost every branch of the iron trade. General prosperity prevailed throughout the West and Northwest. Agriculture, the basis of all business, had recovered from its depression of years and farmers were again most liberal buyers of all classes of manufactured products. Transportation lines were crowded with freight and stockholders looked forward to dividends with old-time confidence. Industrial activity was quickened in every direction. Building projects were numerous in every city and town. Capital promised to embark in new enterprises with much less timidity than for the previous two years. The consumption of iron and steel was therefore expected to increase considerably, and as a matter of course a more profitable business was anticipated by iron and steel manufacturers. Preparations for the World's Fair in Chicago were also to be pushed vigorously in 1892, and this was looked upon as a decided assistance to general trade. With millions to be expended on the fair grounds, millions more in local preparations outside the grounds, and millions more in providing greater transportation facilities, the effect of the coming fair, it was thought, would be very favorable for all classes of trade in the Northwest.

But adverse influences possessed sufficient strength to overcome these favorable conditions. Chief among these, it is believed, is not only the almost complete cessation of the investments of foreign capital in American enterprises, but also the withdrawal of a considerable portion of that already invested. The change from a long-continued stream of foreign capital pouring this way to a steady drain is a discouraging reversal of commercial conditions. Fortunately it came at a favorable time, or the consequences to this country must have been serious, as indeed may yet be the case if it continues for any considerable period. To other hands may be left the task of inquiring into the causes of this disturbance of our customary financial relations with European countries, as it does not properly belong here.

The bright prospect with which 1892 was ushered in did not continue beyond the month of January. The beam combination, which had existed for so many years, collapsed quite abruptly, and about the same time the combination of barb-wire manufacturers dissolved. These events were not in themselves of commanding importance, but they indicated that general trade was not in a condition to support the combinations. Values were determinedly seeking a lower level, and the current swept away some of the obstructions. The course of affairs was from bad to worse as spring opened. Crude iron and steel fell to lower and lower

levels, and diminished production failed to check the decline, as the decrease in consumption outran the falling off in production. Local trade was still further depressed by the boiler makers' strike, which set in on May 1 and continued during the entire summer.

Midsummer found the lowest prices prevailing in the Chicago market that had ever been known there, except for steel rails and common bar iron, but the decline was checked by the stoppage of the Western rolling mills and steel works in July and August, pending a settlement of the wages question. The deplorable conflict at Homestead in July attracted the eyes of the world to the wages controversy in the American iron and steel trades, and invested it with far more importance than would otherwise have been the case. The cessation of production by the mills in July and August had a decided effect on the market. Consumers had in former years been so deceived by the prospects of trouble over annual settlements of the rolling mill wages scale that they failed to take due precautions this year, and very many were caught short of stock. Western jobbers consequently reaped a harvest. Their stores were heavily drawn upon during the entire duration of the lockout, and for some time after it had ended, until the mills were able to catch up with their accumulated orders. Building contractors in Chicago and other large cities paid dearly for their failure to lay in stocks of beams and column shapes before the mills shut down. The collapse of the beam combination had been beneficial to them early in the year, but any advantages thus realized were more than counterbalanced by the sharp advance in the summer which came so unexpectedly.

The improvement in the iron and steel trades, which was stimulated by the long stoppage of the mills, continued until the middle of November notwithstanding the shadow of the Presidential election. Manufacturers smiled to think that they had ever regarded a Presidential election as a disturbing influence and the remark was often heard: "If this is a sample of Presidential election year business we would like to have an election every year." After the election they felt otherwise. The demand fell off and prices receded until the condition of trade resembled that of the spring. The defeat of the Protectionist party at the polls and the depression in trade being coincident, the application of cause and effect seems entirely natural. December was a month of general quiet in trade circles, relieved only by the great contract placed with the Carnegie Steel Company by the Metropolitan Elevated Railway Company, which is estimated to eventually cover 50,000 tons of structural material, but it was taken at the lowest figures ever made in the West on similar work.

### Pig Iron.

January was a month of such activity in coke iron that strong hopes were entertained of an improvement in prices. This led to efforts by consumers to place con-

tracts for long deliveries, in which they found local producers willing to join. Sellers of Southern brands were not permitted by their companies to sell so far ahead, and they consequently failed to get as much business as they would otherwise have probably secured. February was inclined to quietness, and March became exceedingly so. Special efforts were made this month by some of the local producers to force trade, and transactions occurred in No. 2 foundry at the unprecedentedly low rate of \$12.50, which was, however, so exceptional that sellers could not be induced to repeat the performance. Lake Superior charcoal was quiet during the whole of the first quarter.

April witnessed some improvement in the demand for coke iron, and trade was quite active in May, tapering off again in June. During this quarter of the year Southern companies pushed for business more aggressively, and very low prices were made on some transactions, No. 2 soft receding to \$12.50, which was low water mark for the year. Competition among local producers was less pronounced, as some furnaces were blown out to await an improvement in trade. Lake Superior charcoal was fairly active during this second quarter, but the largest consumers persistently held themselves aloof in the determination to force prices lower, manufacturers having apparently stuck a peg at \$16.50, below which they declared they would not go.

In coke iron July was comparatively quiet, August was dull until toward the close of the month, when active buying was renewed, and September was a month of very heavy trade. Southern makers surrendered to consumers during this quarter, and numerous large transactions occurred at prices which were close to the lowest of the year. Prospects grew brighter for manufacturers toward the close of the month. Consumption was perceived to be very rapidly increasing, stocks at furnaces were known to be diminishing, and heavy contracts for Bessemer were expected to take a prominent local producer out of the market for some time. The foundries around Chicago and through the Northwest were never busier than now. The Lake Superior charcoal producers, after a stubborn stand of many weeks, yielded in July and entered large contracts at about \$16, the lowest price thus far known for this product. With the bulk of their output sold far ahead, they again stiffened prices and by the latter part of September were relieved to find their general trade better and advanced prices rather more easily obtained.

October was a very active month in coke iron, perhaps surpassing every other month in the year, and November started out equally well, but trade dropped off quite abruptly after the second week, and did not recover even in December. Lake Superior Charcoal was quiet during the greater part of the last quarter, but the heavy orders previously booked steadily reduced stocks and put this branch of the trade on a vastly better basis than the beginning of the year had found it.

A few points are especially worthy of prominence in connection with the course of the Chicago pig-iron trade during the year, as follows:

1. The consumption of pig iron in Chicago and its immediate vicinity was very heavy in 1892, perhaps in excess of 1890, the best year previously known. So many new enterprises have recently been started in this district, and so many old establishments have enlarged their facilities that next year promises even greater results in this respect.

2. Southern pig iron has maintained its foothold in the Chicago market, notwithstanding the great increase in local production and the very low prices which have ruled during the past year.

3. The pig iron trade of 1892 was unusually spasmodic, periods of great activity being followed by long stretches of dullness.

4. The lowest prices were made in 1892 that the West has ever known.

5. Distinctions between grades are fast disappearing. From 25 to 50 cents now marks the difference in price from one grade to another, instead of 50 cents to \$1, as formerly.

The following table shows the course of prices at Chicago for the leading varieties of pig iron, based on cash payments and averaged for the month on weekly quotations:

Months.	Local coke		Lake Superior		Ohio strong coke.		South ern coke.	
	No. 1.	charcoal.	No. 1.	soft	No. 1.	strong	No. 1.	soft
January.	\$15.25	\$17.25	\$17.75	\$15.75				
February.	15.00	17.00	17.75	15.75				
March.	14.50	17.00	17.50	15.50				
April.	14.75	16.75	17.00	15.25				
May.	14.50	16.50	16.75	15.00				
June.	14.50	16.50	16.50	15.00				
July.	14.50	16.50	16.25	14.75				
August.	14.50	16.50	16.25	14.50				
September.	14.50	16.50	16.25	14.50				
October.	14.25	16.75	16.25	14.75				
November.	13.75	16.50	16.25	14.75				
December.	13.75	16.50	16.25	14.75				
Avg'ge for year.	\$14.50	\$16.75	\$16.75	\$15.00				
Avg'ge for 1891.	15.50	17.37½	18.00	16.00				
Avg'ge for 1890.	17.50	20.75	20.00	17.25				
Avg'ge for 1889.	16.75	19.37½	18.75	16.75				

#### Finished Iron and Steel.

If it were possible to obtain statistics of the total quantity of finished iron and steel marketed in Chicago and its immediate vicinity in 1892, it is believed that the figures would be greatly in excess of any previous year. Season contracts by the agricultural implement works which were placed early in the summer ran far ahead of previous years. Other manufacturing interests intimately connected with agriculture were also heavier consumers of iron and steel than at any former period. Thousands of tons were used in elevated railway construction. Requirements for the World's Fair buildings were large. The consumption by car works and manufacturers of railway supplies was heavier than usual. The building trades were very active, more iron and steel structures having been erected in 1892 than in any former year. Yet prices for the 12 months averaged lower than ever before, and in some cases very much lower. Steel made further inroads upon the domain of iron. Agricultural implement manufacturers purchased soft steel in notable instances at lower prices than they had previously been able to secure on iron. Bar iron prices were lowest in May, having steadily declined from January. They stiffened up in June, influenced by the prospects of a general stoppage of the mills in July. During the three following months there was great scarcity, and prices advanced still further, being well maintained until December, when concessions were made by mills running short of orders. Bar iron jobbers in the Northwest enjoyed a phenomenally large business while the mills were closed down and for some time afterward. Large consumers, who usually buy direct from the mills, were forced to draw on jobbers' stocks and paid dearly for their failure to anticipate the stoppage of the mills and lay in supplies.

The Chicago market is now coming more closely under local influences than a year since. At that time the bar mills in the immediate vicinity were shut down, to all appearances permanently. Now they are in active operation, or will be in a few days, and besides new mills have been started in Indiana within a reasonable distance, so that they can easily reach the Chicago market. Sheet mills have also been built within the Chicago district during the past year, and competition is stronger in the light sheet trade. The plate mill of the Illinois Steel Company has not yet been completed, but is progressing, and may be counted on as an

important factor in the plate trade the coming year.

Average prices for 1892 were lower than for many years, perhaps lower than ever before, although they ran up to a fairly high point in August and September, when the influence of the lockout was most felt. The following table shows the course of prices on mill lots, Chicago delivery, averaged from weekly quotations:

Months.	Common bar iron.		Angles common sheets.		No. 27 common sheets.
	Cents.	Cents.	Cents.	Cents.	
January.	1.65	2.	2.90		
February.	1.67½	1.95	2.90		
March.	1.62½	1.95	2.85		
April.	1.57½	1.90	2.85		
May.	1.52½	1.85	2.75		
June.	1.55	1.85	2.80		
July.	1.62½	2.10	2.90		
August.	1.65	2.10	2.95		
September.	1.65	2.05	2.90		
October.	1.62½	2.00	2.95		
November.	1.62½	1.95	3.00		
December.	1.62½	1.90	2.95		
Average for year.	1.62½	1.97½	2.90		
Average for 1891.	1.70	2.17	2.95		
Average for 1890.	1.82	2.37½	3.17		
Average for 1889.	1.68	2.20	3.21		

#### Merchant Steel.

The year under review was exceptionally prosperous for manufacturers of merchant steel. Although a continuous decline was noted in quotations during this period on machinery and spring steel, yet the decline was not a great one on the whole and prices may therefore be characterized as well sustained. Iron-finished soft steel bars are excepted from this classification, having been referred to under bar iron, with which they now properly belong. The works making a specialty of high-class merchant steel were never busier than in 1892 and for a time some of the largest were practically out of the market, although their productive capacity had been considerably increased. The following table shows the course of prices on mill lots, Chicago delivery, except on tool steel, which is almost exclusively sold from warehouse:

Months.	O. H. spring.	O. H. machinery.	Ordinary tool.
	Cents.	Cents.	Cents.
January.	2.07½	2.15	6.25
February.	2.10	2.15	6.25
March.	2.12½	2.12½	6.25
April.	2.12½	2.12½	6.25
May.	2.12½	2.12½	6.50
June.	2.12½	2.12½	6.50
July.	2.12½	2.12½	6.50
August.	2.10	2.10	6.50
September.	2.07½	2.07½	6.50
October.	2.10	2.10	6.25
November.	2.05	2.05	6.25
December.	2.05	2.05	6.25
Average for year.	2.09	2.11	6.35
Average for 1891.	2.40	2.33	6.70
Average for 1890.	2.75	2.70	6.25
Average for 1889.	2.41	2.50	7.75

#### Steel Rails.

The agreement among manufacturers regulating the output of the mills kept prices of steel rails very steady during the year. January opened with heavy business apparently assured. Large orders were entered by leading lines, the Illinois Steel Company securing about one-third of the total tonnage booked. Inquiries were quite numerous from new enterprises whose projectors had hopes that they would be able to finance them with the easy money market then existing. Prices manifested an upward tendency. The South Chicago works were in steady operation from the first week in January. Orders continued to come in through February and March, and in the latter month the Union Works were started, but the volume of business did not increase as had been anticipated. April and May were fair months, but from that time forward the railroad companies pursued the policy of ordering to cover pressing requirements only and the Union Works stopped rolling rails in October. The year closed under much less favorable conditions than its predecessor, with slightly lower prices in prospect for 1893. The following table shows how

slight were the fluctuations in prices of largest lots:

Jan.	\$31.00 @	\$32.00	July	.....	\$31
Feb.	31.50 @	32.00	August	.....	31
March.	31.50 @	32.00	September	.....	31
April.	31.50 @	32.00	October	.....	31
May.	31.50 @	32.00	November	.....	31
June	31.00 @	31.50	December	.....	31

The average for the year was about \$31.17, against \$31 in 1891, \$34.50 in 1890 and \$31.37½ in 1889.

#### Old Material.

Dealers in old material have no pleasant recollections of 1892. It was a most discouraging year. The stoppage of the local bar mills cut off a trade upon which they have greatly depended, and they found other consuming centers flooded with a heavy supply from all sections of the country within reach of them. The long stoppage of the Pittsburgh and other Western mills intensified the dullness of the year's business, and in August it was asserted that a single Chicago dealer was carrying a stock larger than had ever before been known to be carried by any dealer in the world. For months at a time wrought scrap seemed absolutely unsalable. Autumn brought some improvement after the great lockout was ended, and later in the year one of the idle local mills started up. Another will soon be in active operation. The local consumption may then be restored to its normal condition. The rapid strides made by steel are, however, regarded with much concern by dealers in old material, who fear that wrought scrap is destined to lose its important position as an essential material in the rolling mill trade. In September a combination of dealers secured much of the available supply of old iron rails, in the belief that the demand would enable much higher prices to be realized; but they were disappointed. Values did advance, but not as much as had been expected. The activity among local foundries caused a continuously good demand for cast scrap. The following table presents monthly average prices of leading kinds of old material at Chicago, old rails being quoted per gross ton and the others per net ton:

Months.	Old rails.	No. 1 iron.	No. 1 forge scrap.	No. 1 mill scrap.	Cast scrap.
January	\$22.00	\$17.50	\$12.50	\$12.00	
February	21.75	17.50	12.50	12.50	
March	20.00	16.75	11.50	12.00	
April	18.50	16.00	11.00	11.50	
May	18.50	15.0	10.50	11.50	
June	18.25	14.50	10.00	11.50	
July	18.00	15.0	11.00	11.50	
August	18.00	15.00	11.00	11.50	
September	17.75	15.00	11.00	11.50	
October	18.25	15.00	11.00	11.50	
November	18.50	16.00	11.00	11.50	
December	18.75	16.00	11.00	11.50	
Aver. for year	19.10	15.75	11.17	11.66	
Aver. for 1891	22.75	18.35	13.75	12.25	
Aver. for 1890	25.00	19.75	15.62	13.37½	
Aver. for 1889	22.37½	19.42	14.56	12.60	

#### General Remarks.

The coming year is confidently expected to show an increase in the volume of business in the iron and steel trades of Chicago. The elements which govern the consumption of iron and steel are of too promising a character to take any other view. At the same time the impression is almost universal that prices will be found less satisfactory than those of 1892. How much lower they may go will depend upon circumstances which cannot now be seen. Tariff agitation will have some effect, but perhaps not so much as anticipated. Whatever the result may be, the manufacturers and merchants of Chicago feel that they are as well equipped as those of other sections of the country to meet new conditions and to adjust their business to meet them.

A. J. Rossi has been granted a patent for his method of fluxing titaniferous iron ores.

## Gilbert's "De Magnete."

The following letter appeared in the *Electrician* of December 9, 1892:

SIR: My attention has been drawn to the paragraph in your American Notes on p. 185, in which there is a statement that a translation of Gilbert's "De Magnete" is about to be brought out in the States and which further refers to the Gilbert Club, of which I have the honor to be one of the secretaries.

I think your American correspondent must be under some mistake in attributing the proposed translation to Mr. Mottelay, who is an honorable gentleman. He visited me at my laboratory rather more than a year ago, when we talked of Gilbert and of the Gilbert Club and its long-cherished work. He then begged me to enter his name in one of the then few remaining places in the list of the members, that in due time he might receive the copy of the English translation of "De Magnete." He is not the man to lend his name in an underhand way to an attempt to depreciate the careful work that has been going on for three years by the editing committee of the club.

As to this alleged American translation, it is quite enough for most persons to know that its publishers are to be Messrs. J. Wiley & Sons of New York, who have earned for themselves evil notoriety by their pirated editions of Ruskin's works. The Gilbert Club may well ignore anything emanating from so tainted a source.

As to the last part of your correspondent's paragraph, which relates to the affairs of the Gilbert Club, I will only say that down to the present time the club has not asked for a single subscription from any of its members, nor will it do so until its translation of "De Magnete" is ready for distribution. All the preliminary expenses of its foundation have been met without yet calling on the treasurer. It is true that a very few of the members spontaneously remitted their guinea apiece; and these subscriptions remain intact, awaiting the day of publication. The delay which has arisen since the first rough translation was completed two years ago has been due solely to the labor of revision. But the Gilbert tercentenary does not occur till 1900, and the work will be published within a few months from the present date. Yours, &c.,

SYLVANUS P. THOMPSON.

MORLAND, CHISLETT ROAD, WEST HAMPTON, N. W.

To the Editor of *The Iron Age*:

SIR: One difficulty in answering an attack like the above is that it serves to magnify unduly an individual and an act which would otherwise be left to their proper obscurity. But since our friends have so quickly rallied to our defense, silence on our part might be misconstrued.

The writer is not to be drawn aside from the question of "De Magnete" simply because mud is thrown from a different direction, and an issue raised on a matter wholly foreign to the subject involved. Suffice it to say, the firm who are about to publish "De Magnete" do not publish Ruskin, and were not publishing it at the time they contracted to publish Mottelay's translation. The reputation of a house a century old, who never had a lawsuit or any difference with its authors, requires no defense, and none will be attempted.

As to this translation of Gilbert, its history with us is as follows: A year or two ago Park Benjamin showed the writer, who was visiting him, the original, and spoke of his wish to translate it, and read him certain passages of exceeding interest. He was assured at the time of our sympathy with his ideas. Later he sent Mr. Mottelay to us with the completed

translation, and the work was started at once, in July last.

We had never heard of any other translation, and were even in ignorance of a Gilbert Society and of "one of its secretaries," knowing S. P. Thompson merely as the author of some book of electricity.

Now, what are Mr. Thompson's claims to Gilbert? As nearly as his letter states, that he has announced his intention of making a translation, which, he says, he has not yet completed, and that, with more or less questionable taste, he has accepted money for the translation in advance.

We are glad to note that Mr. Thompson is familiar with the copyright law, for our edition contains many valuable additions of an explanatory character and much of carefully collected notes. The work will be copyrighted in England, and if, when Mr. Thompson's edition appears, if it ever does, it shall also appear that he has supplemented his work with our material he will find that this law will afford us ample protection. We mention this because he has sought to throw discredit on our translation, which he has never seen, and to institute comparison with his own, which has never appeared.

Why Mr. Thompson thinks he has any exclusive claim on Gilbert it is difficult to see. Does he in his pride think Gilbert's mantle has fallen on —? But no! For Gilbert, though dead for over two centuries, has rights that those of the present day must respect and we beg his pardon for even the thought. Very respectfully,

W. H. WILEY,  
Of John Wiley & Sons.

NEW YORK, January 3, 1893.

James Dredge, editor of *Engineering*, has written the following letter to the *Electrician*:

## Gilbertiana.

To the Editor of *The Electrician*.

SIR: Prof. Sylvanus P. Thompson has seen fit to publish a letter in your columns as remarkable for its inaccuracy as for its bad taste, and I will be obliged if you will afford me space to correct the former, the latter being his own affair.

Mr. Thompson appears injured because a hard-working and singularly erudite American is publishing a translation of "De Magnete," the only conceivable reason for this emotion being that such a publication will make more ridiculous than they are at present the hitherto sterile pretensions of the "Gilbert Club," about which such a fuss was made some years ago by Professor Thompson. Since when did this abusive gentleman possess an international copyright in "De Magnete?"

The following facts may be of interest: Last autumn Mr. Mottelay came to consult me as to the course he should adopt with regard to the richly annotated translation he had made of Gilbert's work. He was divided between two opinions. He hesitated to do what he thought might interfere with the vague intentions of the "Gilbert Club," and he was very reluctant to allow injustice to be done to the "De Magnete," a result he feared would inevitably follow, owing to what he considered Professor Thompson's surprising want of knowledge on the subject.

I strongly advised him to publish, urging his absolute right to do so; the folly of allowing the great labor he had devoted to the subject to be wasted; the apparently doubtful, and in any case the limited, issue of the Gilbert Club programme, and, taking his statement for granted, the imperfect character of the translation if it ever were published. Mr. Mottelay decided to follow my advice, and Professor Thompson may therefore look to me as being primarily responsible in the matter.

The reputation of Messrs. Wiley & Sons needs no defense at my hands against the

scurrilous attack of Professor Thompson. They rank as high as any publishers and gentlemen in the world. It is true that they published several American editions of Ruskin's works; and it is also true that they exhausted every possible means to pay a royalty on these works and only abandoned the attempt when, after many years, Mr. Ruskin refused to negotiate.

Professor Thompson may learn more of the standing of Messrs. Wiley & Sons if he ventures to attend the Electrical Congress at Chicago next year.

(Signed) JAMES DREDGE.  
LONDON, December 21.

## THE WEEK.

The American exhibitors at the Madrid Columbian Exposition were awarded 8 gold medals, 14 silver and 15 bronze medals, besides receiving honorable mention in several cases.

The favorite brands from Florida orange plantations are so much sought for that the empty boxes are at a premium for repacking, and the fraud should be denounced.

Europe competes sharply with the United States for South American trade by constantly improving steamship communication. Line after line has been added, until to-day there are five direct and competing European lines to the West Coast of South and Central America and more than 30 to the East Coast. The United States has but six to the East Coast, five of which are owned and operated by English companies and sail under the English flag, while on the West Coast we are wholly unrepresented.

A monolith 115 feet long, in form resembling Cleopatra's needle, has been successfully quarried in Wisconsin, and will be exhibited at the World's Fair. This length exceeds, by 10 feet, the tallest obelisk of the Egyptians.

Subscriptions for the charter of four steamships to run regularly to Jacksonville, Fla., are being taken by the Philadelphia Produce Exchange.

Grand Master T. V. Powderly has bought a farm of 71 acres near Hyattsville, six miles from Washington, for himself and a syndicate of workingmen, with a view to establishing a group of factories and a co-operative workingmen's town. The site chosen is convenient to both the Pennsylvania and Baltimore & Ohio roads.

Ice in the Delaware River last week prevented the docking of the cruiser "New York" at League Island and blockaded the harbor.

Railroad business is heavier than at the corresponding date in former years, but net earnings are less satisfactory, owing to competition and the costs of operating.

Mr. Cullom, chairman of the Senate Committee on Interstate Commerce, immediately after the reassembling of Congress will urge the consideration of the measures that have been proposed, intended to vitalize and add strength to the Interstate Commerce law, upon which heavy inroads have been made by recent Federal Court decisions. The most important change contemplated is an amendment to protect witnesses in order that they may be compelled to testify.

The Brooklyn Bridge promenade will be relaid with yellow pine, for the first time since the opening in 1883. The planks will be placed crosswise instead of lengthwise as before.

The proposed ship canal convention, called by the Duluth Chamber of Commerce, will be held at Washington Janu-

ary 12. The object of the convention is said to be "to consider such matters as properly pertain to securing the construction of a deep water way between all the great lakes and tide water through the territory of the United States, especially the authorization of routes and the advisability of perfecting a permanent organization to forward the work by all legitimate means."

Mr. Rockefeller's Christmas gift of \$1,000,000 to the University of Chicago makes a total of \$3,600,000 which he has given to this institution.

The year just drawing to a close has been one of great prosperity to the grain trade of Philadelphia. The exports of corn were 19,005,971 bushels against 2,201,264 bushels in 1891, and of wheat 10,001,172 against 6,743,863 bushels last year.

The Master Builders' Exchange of Philadelphia have resolved to recommend to the national organization a method of arbitration that shall be universally applicable and which shall fully recognize the rights of both employers and workmen.

The Mare Island navy yard on the Pacific coast has a fine shipbuilding plant, including modern tools put into the shops four years ago at a cost of \$150,000, but only a small portion of which have ever been used.

An ordinance adopted in Philadelphia after much discussion makes it a nuisance to run a locomotive or stationary engine with soft coal.

The damage to property in Long Island City, caused by the explosion of 100 pounds of dynamite while being thawed out near the East river tunnel, is estimated at \$200,000. The next question is, who is responsible?

Yellow fever is almost an epidemic in La Guayra, Caracas and other large cities in Venezuela. The Government directs that importations of merchandise must be direct whenever it is possible, and that the British port of Trinidad and the colony of Curaçoa may no longer be used as warehouses for goods in transit to Venezuelan ports.

Incendiary fires have cost Milwaukee about \$5,000,000 since the end of October. The latest, which destroyed the street railway plant, caused a loss of \$75,000 in the single item of machinery.

The water works conduit at Toronto extends under the bay. The pipe became choked with weeds, obstructing the flow of water. It then rose to the surface and broke at several points.

The suspension of the Guion line of steamships is occasioned by the interruption of the emigrant trade added to a season of unprofitable freights. Its crack steamers, "Alaska" and "Arizona," for a long time were among the foremost crossing the Atlantic.

The Retail Grocers' Union of this city is about to erect a five story stone building on east Fifty seventh street, where goods purchased in bulk can be stored until such times as they are required for consumption.

A second whaling steamer is to be added to the fleet employed by a San Francisco firm in the South sea fisheries.

The three commissioners appointed to make preliminary surveys for the projected continental railroad to connect the republics of North America with those of Central and South America state that a practicable route has been found, the engineering problems presented in no instance exceeding those encountered in the construction of the transcontinental roads of North America.

An inquiry has been instituted at Washington with reference to an alleged discrimination against the United States in freights coming over the Canadian Pacific Railroad from China and Japan. Goods come through under the consular seal without inspection and thus are more favored than if coming over American roads.

In spite of the restrictions placed upon immigration, due to the cholera scare, the influx of aliens is still very large. Here are the official figures for November, 1891 and 1892, and for the 11 months in each year ended with November:

	1891.	1892.
Month of November.....	38,615	27,492
Eleven months.....	562,073	520,768

So it will be seen that the tide is still running high.

The American coal producers who are endeavoring to find a market in Europe for anthracite will first put up stoves in Berlin, with the expectation that foreigners will become convinced of its excellence for domestic purposes. An export trade would relieve the glut at home.

Panama Railroad Company officials state that on February 1 the company will sever all business relations with the Pacific Mail Steamship Company and conduct their through business between New York and San Francisco with the North American Navigation Company, recently organized in San Francisco.

A Fall River dispatch says that the year 1892 has been a prosperous one for the cotton manufacturing corporations, their dividends averaging 7.86 per cent., or an increase of nearly 2.5 per cent. over 1891.

Exclusive of the fine new ship to be built by the Cramps for the International line, that firm have five vessels under construction, for which the contract price is \$14,440,000.

Bankers supposed to represent the Vanderbilt interests have paid \$800,000 for 23,500 acres of coal land in West Virginia, to be leased in parcels to small operators. The coal costs to mine 40 to 50 cents per ton.

Russia is said to have 1,800,000 Berdan rifles which are being converted into a smaller caliber at Liège in Belgium, 400,000 having already gone forward. The new arms will be about 38 caliber, instead of 40 caliber, as before, and thus be adapted to the use of smokeless powder.

San Francisco is expecting to derive important advantages from the construction of the proposed Mexico, Cuernavaca and Pacific Railway, upon which the engineers are now engaged. When the road is completed San Francisco will be only 350 miles distant by rail to the city of Mexico from the nearest port. St. Louis, which is making special efforts to secure Mexican trade, is 1900 miles distant by rail.

The frequency of poisoning cases among the former Homestead workmen which are coming to the knowledge of the authorities in Pittsburgh point to the commission of a stupendous crime. Referring to two new cases just reported the coroner says: We hear almost every day of men who have died rather suddenly after leaving Homestead, or of others who suffered with all the symptoms of the alleged poison victims.

The capital of the National Wall Paper Co., familiarly known as the Wall Paper Trust, has been increased from \$20,000,000 to \$38,000,000, in order, it is stated, to cover the value of the plants just purchased. Some of the trusts have a wonderful power of expansion and absorption.

## Fluctuations in Prices in 1892.

(With Supplement.)

We present in the accompanying plate, in graphic form, the fluctuations in the metals, tin, lead, copper, spelter and tin plate, the variations in the price of what may be called the raw materials, pig iron and steel billets, and the variations in the price of some of the leading lines of finished iron and steel, including barb wire, tank plate, wire nails, bar iron and cut nails. The diagrams have been constructed from the weekly quotations in *The Iron Age*, all the figures relating to metals being based on the New York market, while the others were chosen with special reference to the leading distributing points. The plotting has been so arranged that even slight fluctuations in the price are fully brought out.

On the whole, the tendency has been downward in the majority of products, the only exceptions being copper and tin plate, the former metal having reflected in the last few months the effect of the understanding among the leading producers of the world. Tin has been under speculative management practically during the whole of the year, while spelter and lead have felt the influence of a heavy production.

The diagram which indicates the fluctuations in pig iron shows how Bessemer pig at Pittsburgh suffered an almost uninterrupted decline, the only slight recovery being that of November, which has since been lost. Southern Gray Forge fell off steadily until September, when heavy sales for future delivery placed the producers in a position to mark up prices, without, however, doing any large business at the advance. Since then there has been a halting market and on the whole an easing tendency.

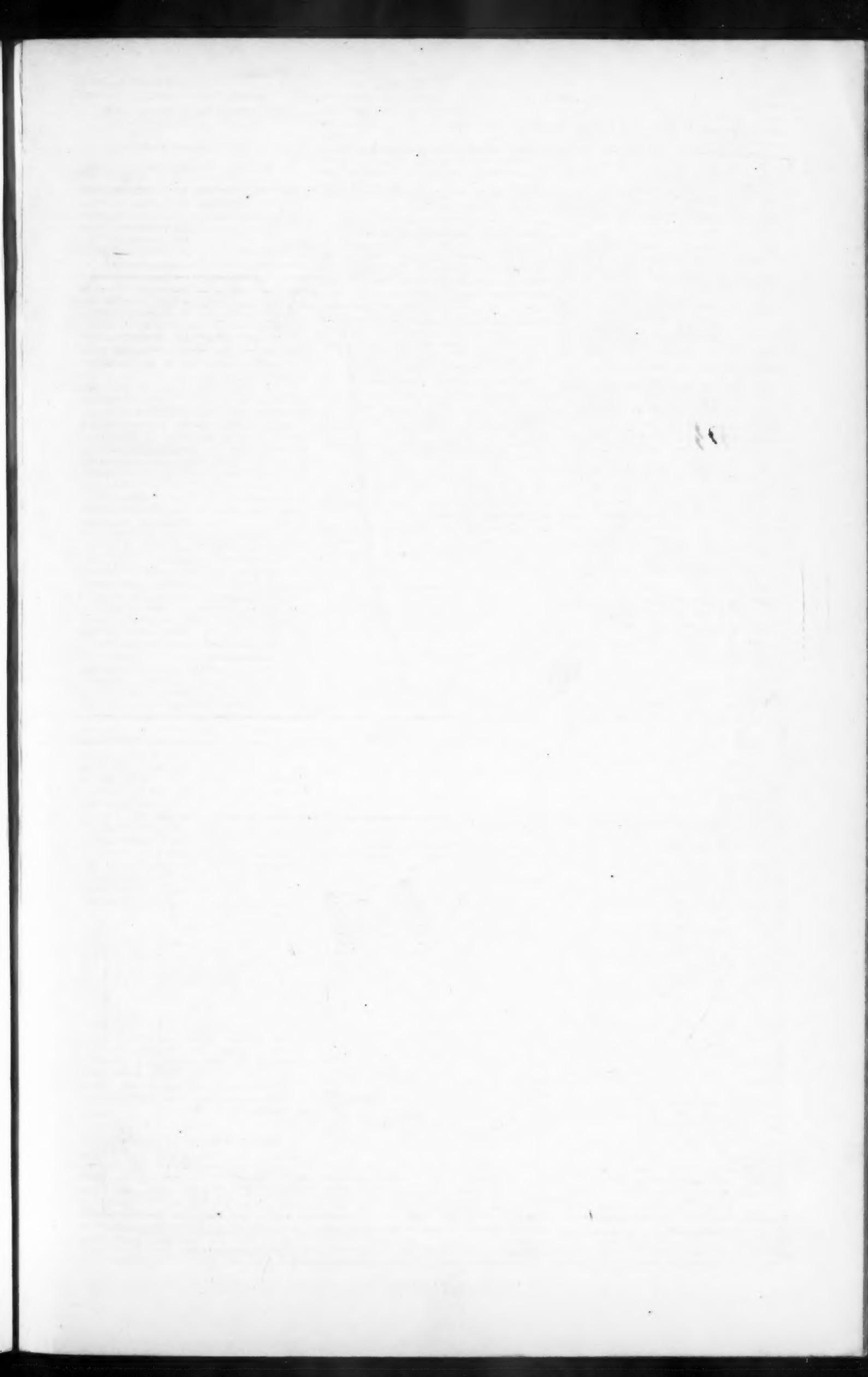
The plotting of the line showing the fluctuations in steel billets was attended with considerable difficulty, since there were often wide differences between the price for spot steel and for future delivery. The effect of the stoppage of some of the leading producers in midsummer is clearly indicated and the rise is shown which grew out of the fact that consumption had increased so largely that there was a scarcity of spot material during November. Since then soft steel has fallen to figures lower than any on record.

In finished articles the quotations for tank plate at Philadelphia reflected the influence upon the Eastern plate trade of the stoppage of the Pittsburgh mills—an influence which has now been completely exhausted. Bar iron, cut nails and barb wire close the year at prices lower than any on record.

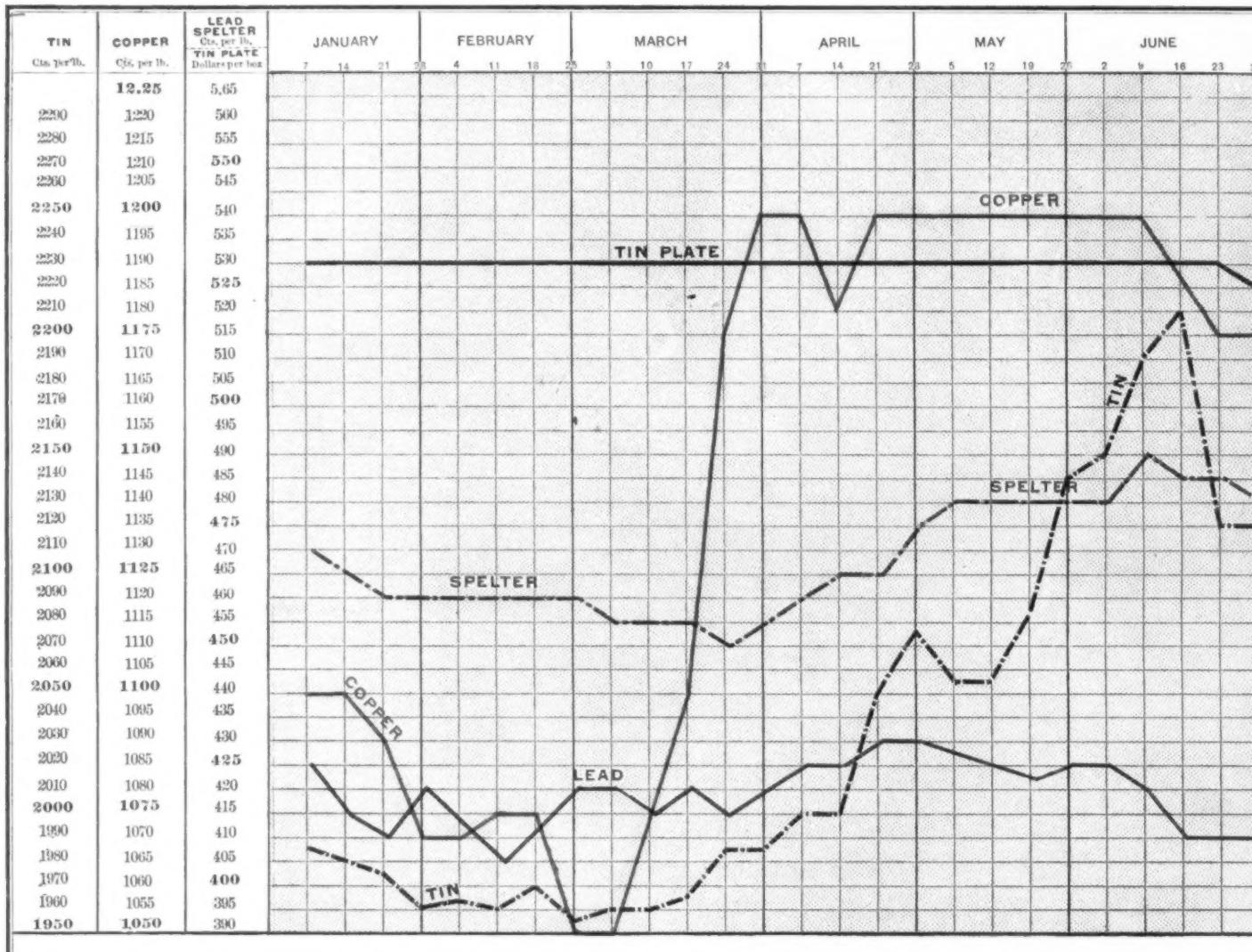
On her preliminary trial the defense ship "Monterey," at San Francisco, did not develop speed sufficient to satisfy the contractors, though her engines averaged about 150 revolutions a minute.

The Bureau of the American Republics is informed that the Government of Trinidad and Tobago has decreed the free admission for five years from January 1, 1893, of all iron work, machinery, steam engines, gas engines, boilers, pipes, dynamos, lamps, posts, coal, pitch, meters, gas stoves, electric wires, &c.

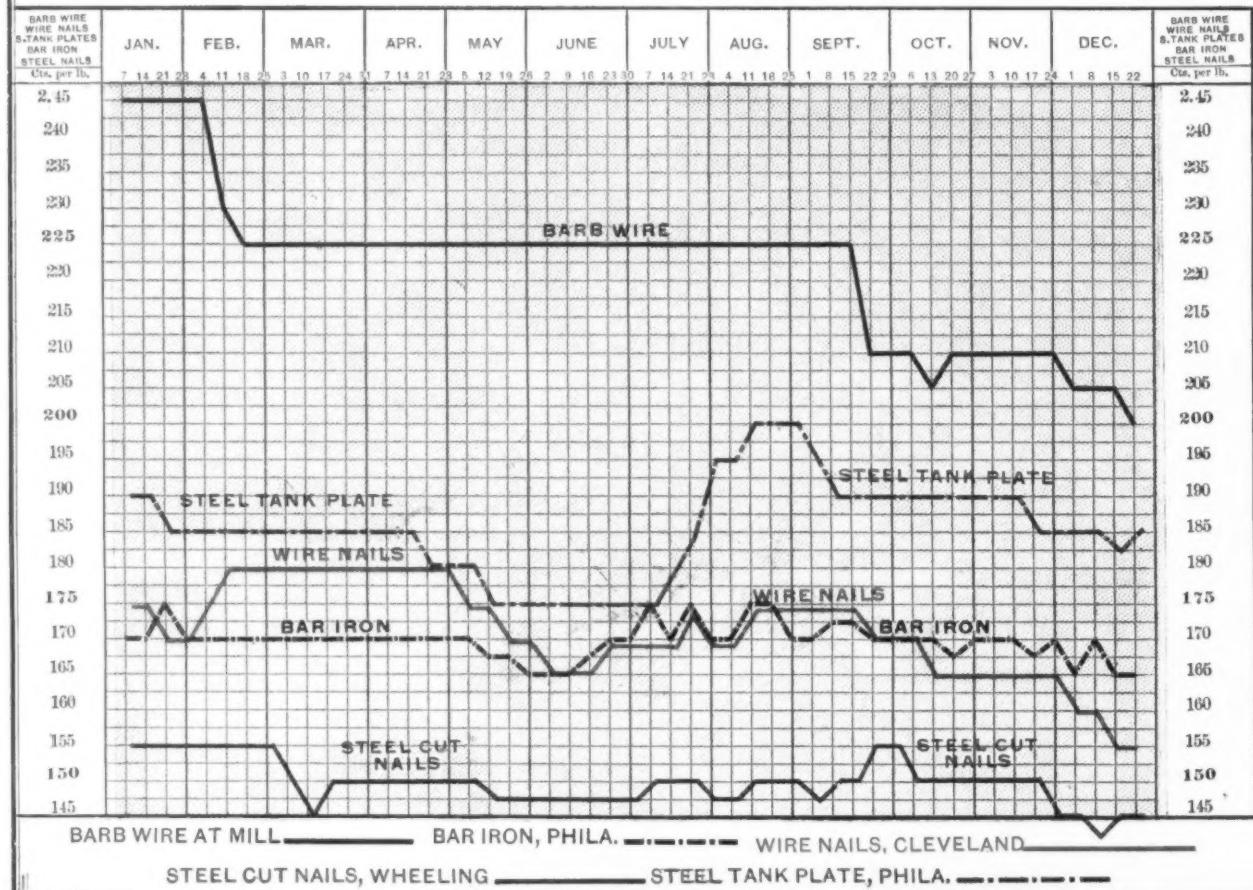
It is stated at the Navy Department that a concern has been incorporated at San Francisco, and has half of its working capital already subscribed, for the establishment of an armor plate mill. The plant, it is understood, will be capable of producing not only the heaviest armor, but will be equipped for the manufacture of guns, shot and shell and heavy forgings of all descriptions.



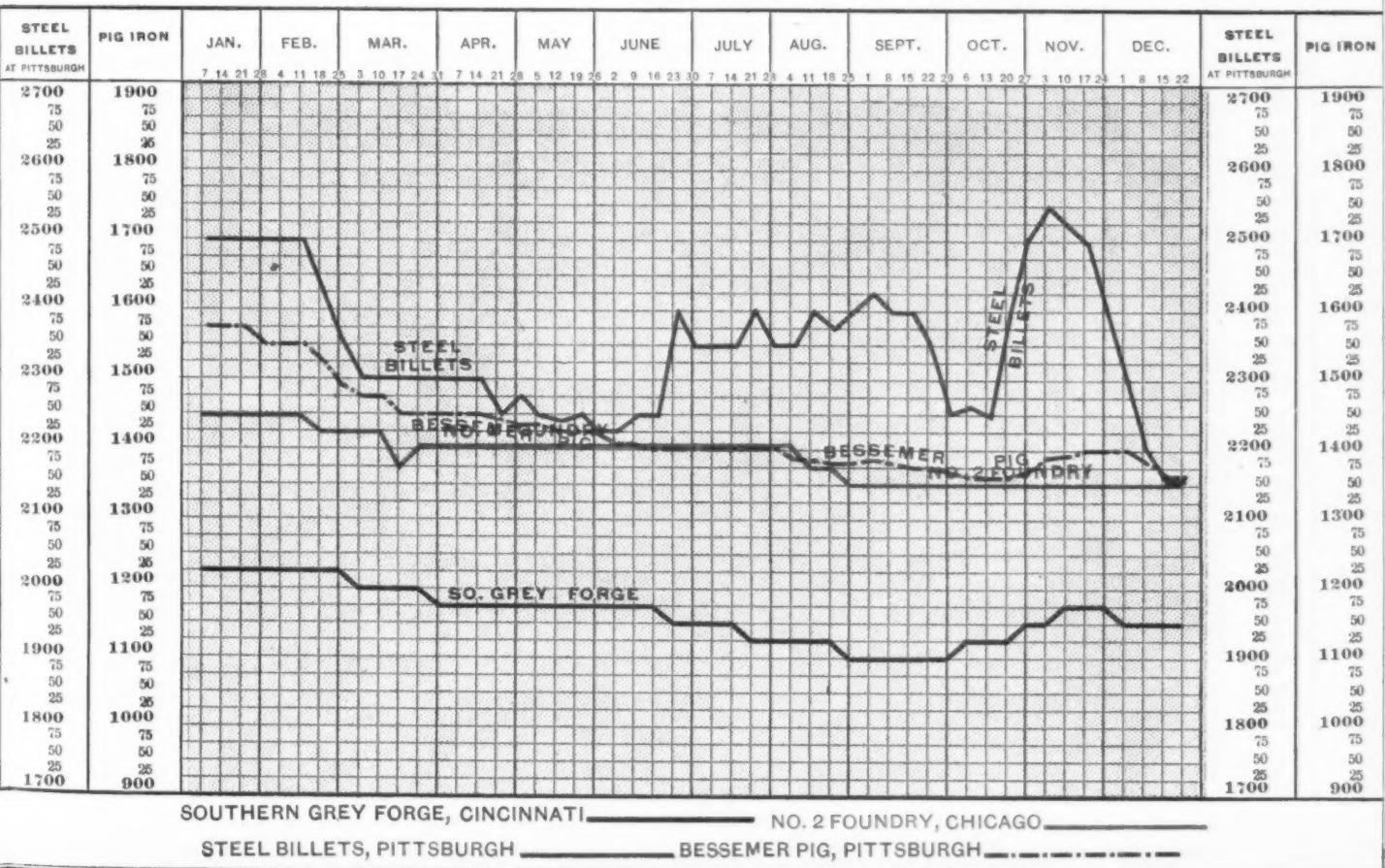
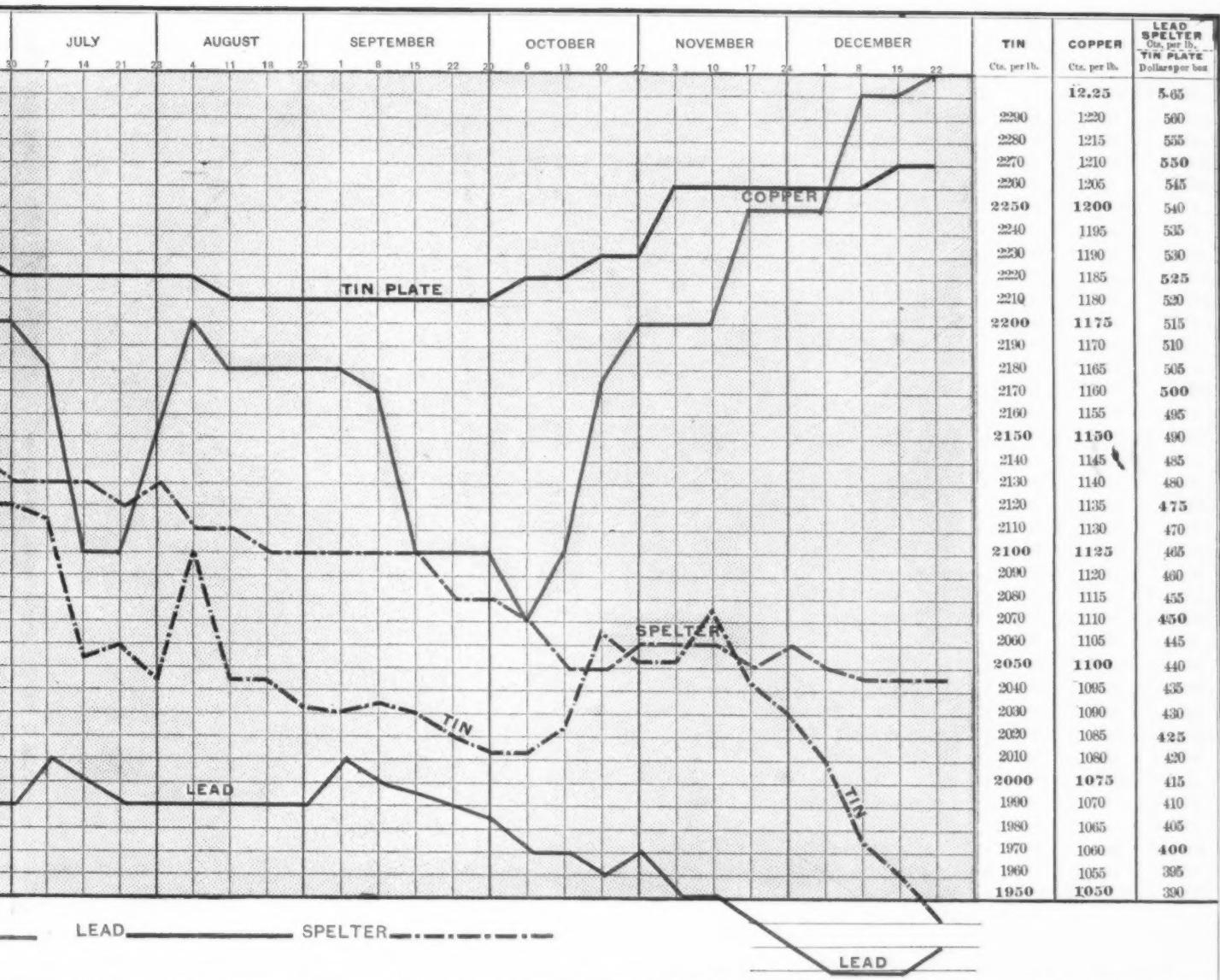
SUPPLEMENT TO THE IRON AGE, JANUARY 5, 1893



## NEW YORK PRICES OF TIN PLATE.

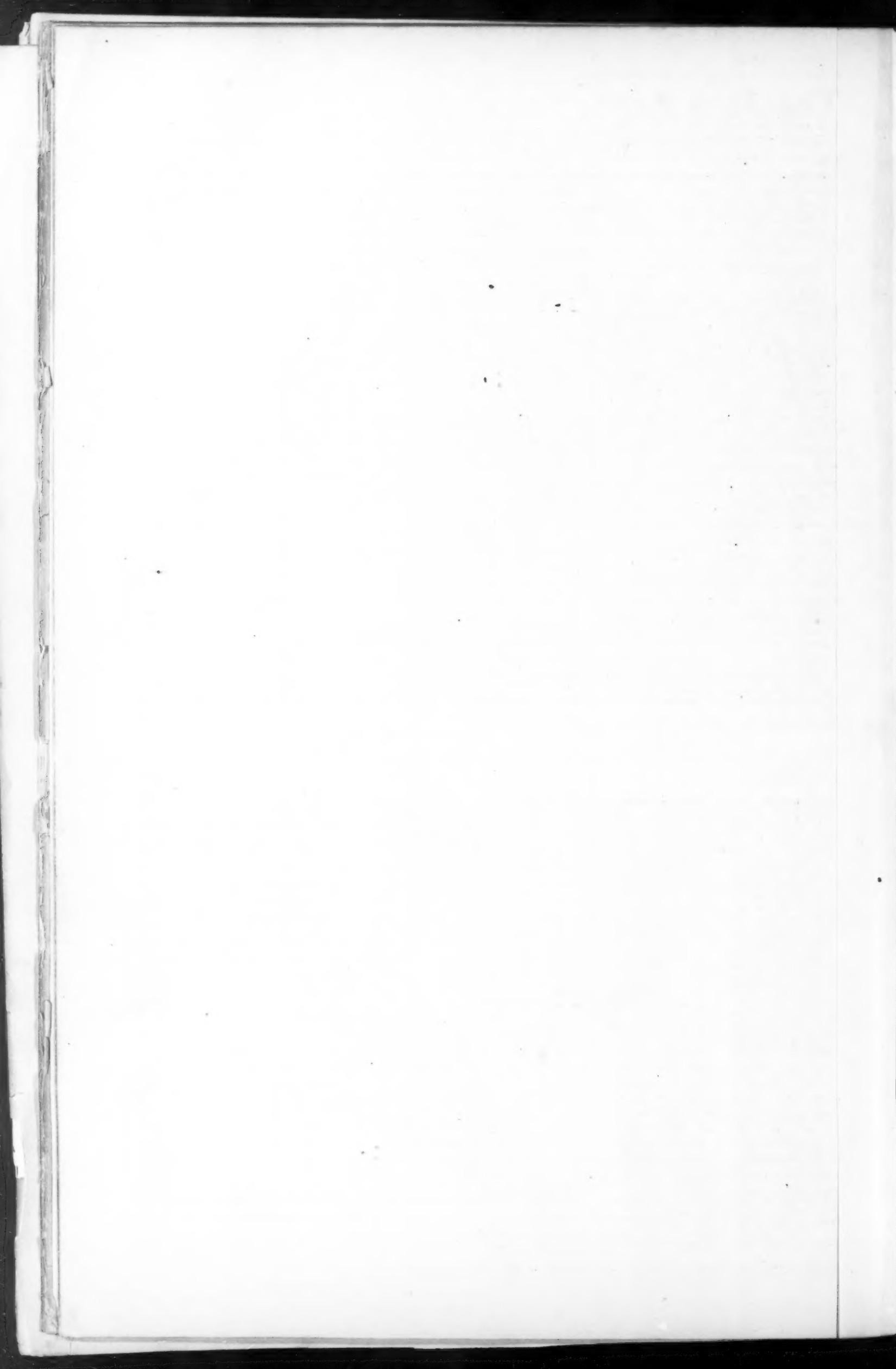


## **FLUCTUATIONS IN THE PRICES OF CRUDE AND**



SOUTHERN GREY FORGE, CINCINNATI — NO. 2 FOUNDRY, CHICAGO  
STEEL BILLETS, PITTSBURGH — BESSEMER PIG, PITTSBURGH

FINISHED IRON AND STEEL AND IN THE METALS.



# The Iron Age

New York, Thursday, January 5, 1893.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.  
CHAR. KIRCHHOFF, - - - EDITOR.  
GEO. W COPE, - - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.  
JOHN S. KING, - - - BUSINESS MANAGER.

## Unprofitable Rivalry.

Widely divergent views are entertained by business men in the United States—depending much upon what part of the country they live in—respecting our commercial relations with Canada. There is a class of men who cherish schemes for the enlargement of the national domain. Others hope simply for some kind of commercial reciprocity, to be brought about by making things so uncomfortable for our neighbors that they will voluntarily sacrifice their commercial relations to the mother country in exchange for the greater possible advantages to be derived from closer relations with the United States. But when we inquire among those Americans who are doing business in sections of country contiguous to the Dominion, whether in Boston or Chicago, it is common to find that they are most concerned that all outstanding questions should be settled on business principles alone. They cherish no hostility to the Dominion, nor are they unfriendly to the Canadian Pacific Railroad or other routes of traffic controlled by a foreign government. On the contrary these routes are regarded as maintaining a wholesome competition with parallel lines on American soil, whose rates, under other circumstances, might be extortionate, crippling intercourse. The Boston *Herald* reflects sentiments widely entertained when it says:

The access that we now obtain to the West via the Grand Trunk and the Canadian Pacific is of inestimable advantage to the people of New England. It is by means of this that the exactions of the American railroad companies are held in check. Not only are we thus permitted to have freight rates named that are the same as those granted to our business rivals in New York, but these latter have the prices charged for transportation to and from the West kept down by the knowledge that the rates cannot be named higher than New England rates, and that these are controlled by the possibilities of Canadian competition. Once shut the door to these competing routes, and not only would the freight rates between New England and the West advance beyond the range of New York rates, but the rates to and from New York and Philadelphia and the West would soon be lifted as the result of mutual arrangement between the great transportation companies of this country.

Partisan feeling is liable under excitement to become oblivious to commercial interests, and finally to reach out for the accomplishment of certain ends regardless of any cost. Diplomatic tactics which tend to embarrass trade rather than to promote it can hardly be called satisfactory or successful. Undoubtedly the New England States, particularly, need all the facilities that the Canadian railroads afford, and it would be entirely in accordance

with natural laws if in due time the seaboard terminal of the principal Canadian railway systems should be in the port of Boston. Already there are signs that the enormous grain harvests of Manitoba and the regions beyond may take that channel. In the next Congress long-voiced questions relating to the intercourse of the Canadian railways at the boundary line may come up for settlement.

## Improving the Consular Service.

The mercantile interests of the United States have suffered incalculably from unsuitable representation abroad at consular ports. This results mainly from the system of making appointments as a reward for partisan service and subsequent removal without cause. An effort is now making for the establishment of a new cabinet portfolio in this country which in some measure shall be responsible for the men selected for official position, that they may have qualifications essential to the proper discharge of their functions, some knowledge of mercantile usages as well as of the language of the country to which they are accredited.

An important meeting was held in Boston a few days ago under the auspices of the Merchants' Association, to consider the consular service of the United States, what it is and what it should be. The association summoned to its board for the discussion of this topic Hon. Joseph S. Potter of Fredericksburg, Va., who for fifteen years was the consul at Crefeld, Germany; Hon. J. L. M. Curry of Washington, ex-Minister to Spain and at present the head of the Peabody educational fund; Hon. John T. Abbott, the present Minister to Colombia; Gen. E. C. Hooker, M. C., of Mississippi, a member of the Committee on Foreign Affairs, and Hon. Robert R. Hitt. Many prominent merchants and others in public life were among those present. President Jonathan A. Lane said the time had come when these great United States of America should, in its representatives in other lands, at least equal all the other brotherhoods of nations. Mr. Potter, the next speaker, emphasized the need of utilizing the service as an efficient practical force in opening new channels of trade, to popularize in foreign markets the industrial products of the country. The blue book shows that there are about 1100 persons in consular positions located in business centers in various parts of the world who might be a powerful force if organized upon a business basis and marshaled as auxiliaries in the work of merchants, manufacturers and artisans in developing the industrial resources of the Republic.

He added: "They should be regarded as lookouts upon the ship of state, giving immediate information of whatever may advance or retard commercial progress. Such information should be a picture of facts, so clear and certain as to stand beyond question as a guide for producers and exporters, and then promulgated to the country in a concise form with such

promptness that the public would not be obliged to rely for foreign commercial information upon even the most enterprising journals.

"Beyond these considerations there is yet a more practical field of usefulness for consular representatives. For example, I have personal knowledge of an officer assigned to duty at a small capital in the interior of the Continent of Europe. After arrival at his post, investigation showed that American manufactures and food products were unknown in that locality. Under his management, however, in less than two years a large variety of American manufactures and food products without limit could be there purchased, and 'stores' for the especial sale of American goods were established and became popular in different parts of the city. Efficient consular officers often appeal to their government for a trifling assistance in such most useful work, always without avail, however."

Mr. Potter showed further that to attempt to make the consular service efficient in the direction named would be useless unless the gentlemen designated to fill consular positions were adapted by natural inclinations, education and experience, to perform the particular duties assigned them. He represented that under the present system the consular service is supported almost entirely from fees paid by foreign export merchants and manufacturers, whose interests are practically hostile to the Revenue Department of the United States; that, therefore, the principle is bad and unbusiness-like.

In Germany and France, whose interests in commerce and manufactures are dwarfed in the remembrance of those that are growing in the United States, such a department is regarded as the most important portfolio connected with the government.

The speaker contended that if the consular service was strengthened by appropriate legislation and the commerce of the American States was conducted in American ships, our vessels would dot the seas in every climate, and the emblems of their nationality be familiar in all the ports of the habitable globe.

Mr. Curry, ex-Minister to Spain, spoke more especially of the qualifications of a consul, who should not only be familiar with the duties of his position but be polite and accommodating to buyer and seller, shipper and carrier, foreigner and countryman.

"The consul should study the national characteristics of the people and their peculiar requirements; the productions of the country, their adaptedness to our needs and wishes, their relative excellence as compared with the products of other foreign countries; the tariff laws; the openings for commercial intercourse; the inducements or opportunities for new or enlarged business. He should be reasonably conversant with the laws and treaties that may affect his position; with the principles and details of mercantile law; with the usages of trade in force in the country to which he is accredited. In

short, as a faithful and conscientious public servant his duty is to promote the lawful trade of the United States by every fair and proper means, and to uphold the rights and privileges and promote the advantage of American merchants."

Mr. Abbott, Minister to Colombia, added that we need a corps permanent in its essence, conservative in its thought, but at the same time vigorous in action, and, more important than all, in quick touch with the most advanced thought of the American people.

He would place the service, so far as appointments are concerned, on a level with the judiciary. Then officers would be appointed for life, selected for their known abilities and be removable for cause. These views elicited general approbation and embody considerations that commend themselves to all thoughtful legislators.

#### The Danger of Cholera.

There is no single question upon which the voice of the business community should be heard with greater emphasis than that of guarding against an invasion of cholera this year. We venture to say that no subject is being given so much thought as the possible effect of such a visitation upon our business. Yet, it is a curious fact that it is very rarely referred to in print. Every forecast made privately by business men, be it sanguine or otherwise, is coupled with the one reservation, "provided we keep free from cholera."

Under ordinary circumstances the influence of a panic of fear on the commercial interests of this country would be serious enough, but this year it would be particularly disastrous because it would cause a failure of the Chicago exposition. If cholera reappears this spring, the vexatious delays due to the necessary quarantine measures will greatly cut down the number of foreigners who would visit this country. In itself this would not be a very serious matter, because after all the foreign visitors will be a factor of minor importance.

But if it should happen that deaths from the plague took place beyond the Allegheny Mountains, or if there should only be a single case in Chicago proper or in its vicinity, the attendance at the fair would drop off at an alarming rate and the undertaking would be a flat failure. It is quite useless to blink at the fact that the whole country would seriously suffer with the interests of those most directly stricken.

The whole matter is altogether too serious to be waved aside as an effort to borrow trouble. It will not do to attempt to silence discussion. It is in the thoughts of every conservative business man now. It is important that the public should be thoroughly aroused to the danger and that the business interests of the country make their power felt.

They do not want to have enormous losses inflicted because there is bickering over an exercise of authority. They will not allow professional jealousies to

imperil the well-being of a whole nation. Vigorous and enlightened measures which will reassure the most timid must be adopted. This is no time for dallying. The danger should be faced squarely. It is not a matter which those who are not living on the seaboard can afford to placidly neglect. The central West has a very conspicuous interest in it. Pressure should be put upon the authorities to make every possible preparation to meet a possible visitation. When it comes from business men individually or through our great commercial bodies, resistance to it is out of the question.

The struggle between soft steel and cast iron is becoming very close in architectural structures. In any one of our large cities examples of both the cast iron and the steel columns may be observed, as part of the iron skeleton of the "sky-scrappers" which are becoming so general. Although cast iron is so much cheaper, per pound, there is not much difference in total outlay. In a case which has come under our notice the design for a building called for either steel columns weighing about 575 gross tons, or a structure with, roughly, 975 tons of cast iron. The total cost for the former figured out about \$36,000, while the outlay for the latter was estimated at approximately \$33,000. Rolled material, especially when protected, as is now generally the case, possesses advantages which to many builders outweigh the difference in cost alluded to. Whether the gap between the prices may be closed by further lowering of the rate per pound, or by lessening of the weight in favor of the one or the other material the future alone can tell.

#### OBITUARY.

##### DAVID H. FLACK.

David H. Flack of Lansingburg, N. Y., died December 23, of apoplexy. He was born September 19, 1818, in West Hebron, Washington County, N. Y., and was educated in St. Lawrence County. In 1850 he engaged in the hardware business at Lansingburg with John Mairs as partner. Six years afterward he bought out Mr. Mairs and continued alone until 1858. His brother, Isaac G. Flack, was then associated with him. In 1861 they bought the brick row at the corner of Second avenue and Eighteenth street, and removed there. David H. Flack retired in 1871. He was afterward a wholesale flour and commission merchant.

##### NOBLE PHILLIPS.

Noble Phillips, aged 81 years, of Honesdale, N. Y., died December 20 of apoplexy. He was a general agent of the Walter A. Wood Mowing & Reaping Machine Company from its infancy. For 25 years he was president of the Phillipsburg Land Company of Cumberland County, Tennessee.

##### EDWARD H. MARTIN.

Edward H. Martin, constructing engineer of the Baackes Wire Nail Company, Cleveland, died last Thursday. Mr. Martin was born in England, February 18, 1832. He received a liberal common school and scientific education, gaining the degree of civil engineer, and he engaged in many large manufacturing enterprises in his native land. In 1868 he came to this

country, and the following year acted as assistant engineer in superintending the construction of the bridge over the Ohio River at Louisville. In 1870 he supervised the construction of the Reese Agricultural Works at Mansfield, in that year inventing one of the first automatic horse rakes ever manufactured. In 1872 he came to Cleveland and built the Union Steel Screw Works, holding the position of constructing engineer. In 1874 he entered the employ of the Cleveland Rolling Mill Company, remaining there until 1891. While with that company he designed all the machinery that was put up in the works, including boilers, engines, pumps and all varieties of work. He invented an improved pumping engine which, under the name of the Martin pump, became known everywhere. One set of pumping engines built for the water works of Toronto, Canada, has a capacity of 12,000,000 gallons per day. Other pumps for Corning, N. Y., have a capacity of 8,000,000 gallons. He also built many pumps for the Superior Copper Mines. In 1891 Mr. Martin entered the service of the Baackes Wire Nail Company, remaining there until his death. During this period he built the Baackes rod mill.

##### GEORGE BALDWIN.

George Baldwin, proprietor of the Springville, N. Y., foundry, died in the vestibule of the Methodist Church at that place December 25. He was 78 years of age.

##### MORRIS RAMSEY.

Morris Ramsey, general manager of the Southwest Coal & Coke Company, one of the interests of the H. C. Frick Coke Company, died on Thursday night, the 29th ult., at the Sutton Hospital in Allegheny, Pa. Mr. Ramsey had been identified with the coke industry almost from its commencement. He was originally a miner, then a mine inspector and later became a mine engineer, until he was finally made general manager of the above-named coke concern.

#### PERSONAL.

There has been a considerable change in the personnel of the Bethlehem Iron Company. John Fritz will relinquish the superintendency of the works; Owen Leibert will take Mr. Fritz's place. Mr. Leibert has for many years been one of Mr. Fritz's assistants. Mr. Fritz will be the consulting engineer of the works. Russell W. Davenport, the present assistant superintendent of the works, will be the second vice-president of the Bethlehem Iron Company. Robert H. Sayre, Jr., will assume the position of assistant superintendent. He is the son of Robert H. Sayre, Sr., third vice-president of the Philadelphia & Reading Railroad and general manager of the Bethlehem Iron Company. Albert Ladd Colby, the head chemist, will hereafter be superintendent of the blast furnaces. Mr. Fritz was appointed the superintendent of the works June 20, 1860, having been before then superintendent of the Cambria Iron Works at Johnstown, Pa.

F. T. Aschman, who for the last eight months has been employed as chemist to the Charleroi Plate Glass Company, at Charleroi, Pa., has recently been elected Professor of Chemistry at the Pittsburgh College of Pharmacy. He has accepted the position and entered upon his new duties the 3d inst. He will also establish a general analytical laboratory in Pittsburgh in the near future.

Superintendent Medden, of the American Fire Engine Company, Seneca Falls, N. Y., will talk about "Steam Boilers" to Mackie's class of mechanical drawing in

Myndreas Academy, that place, on the evening of January 11.

The chief chemist of the Edgar Thomson Works is Charles B. Murray, not William Murray, as has been erroneously printed.

## CORRESPONDENCE.

### Standard Sizes of Bolts and Nuts.

*To the Editor:*—We have read with great interest the circular of the American Railway Master Mechanics' Association published in *The Iron Age*, Dec. 22, under the heading, Standard Sizes of Bolts and Nuts, and heartily indorse the resolutions of the association, in its efforts "to commend and emphasize the United States standard, urging upon all a rigid adherence to the same, and deprecating the use of over or undersized bolts or nuts." For years we have repeatedly refused to make oversize taps and dies, so called United States Standard, except at special price, and have refused work rather than fill the order at other than special prices, believing the use of rough iron sizes has a tendency to corrupt the United States Standard, and in the direction to impair the only acknowledged system whereby accuracy and interchangeability of bolts and nuts is assured.

We had watched, with fear of corruption, the persistent efforts of some people to insist on United States shape of thread on other than regular leads and sizes, but believe the American Railway Master Mechanics' Association will be successful in its efforts to protect the United States Standard. Let all manufacturers of taps and dies rally to the support of this association, thereby encouraging it in its good work. We trust your valuable paper, *The Iron Age*, which we have always found on the side of progression, will aid us all in protecting the system known as the United States Standard.

J. M. CARPENTER TAP & DIE CO.  
PAWTUCKET, R. I., December 31, 1892.

### The Accident to the "Umbria."

The steamship "Umbria," belonging to the Cunard Line, left Queenstown on the afternoon of December 18 *en route* for New York. From the start she met unusually severe weather, but was steaming without accident until, on the afternoon of December 23, when about 125 miles due east of Sable Island, the engineer in attendance noticed an unusual vibration in one of the main frames and notified the chief engineer, Lawrence Tomlinson. After quick examination of the shaft at the point nearest which the disturbance appeared to be he decided to stop the engines. A close inspection showed that the shaft at the thrust bearing had been cracked, not entirely through, but apparently at least two-thirds of the metal had broken. The break occurred in the third groove, counting from the forward end of the bearing, and extended in a diagonal direction between the collars.

In order to understand what occurred and how the trouble was remedied, it will be necessary to explain briefly the thrust bearing. The shaft of the "Umbria" is 25 inches in diameter, is built up of sections 20 feet long, the abutting ends being flanged and bolted together. On that section of the shaft nearest the engine are formed several collars or circular flanges, thus forming a series of grooves having a diameter equal to the diameter of the shaft and adapted to receive U-shaped collars, one for each groove, which constitute the bearing proper and which are bolted to what is practically an extension rearward of the bed plate of the engine.

This bearing, taken as a whole, is designed to counteract the forward thrust of the shaft due to the action of the propeller on the water.

Upon the removal of these collars or bearings the cracks in the shaft came into view. One of the first works toward repair consisted in passing a chain beneath the shaft to the rear of the bearing and attaching the ends to the girders supporting the deck above, the slack being taken up by turn-buckle arrangements. We may add that after the shaft had been repaired this chain was left on as forming an additional support for the shaft or a sort of bearing and guarding against any injury to the hull should the shaft part at any time.

The engineer decided to cut U-shaped openings in the two collars on each side of the break and then insert three 5-inch bolts, one in each pair of grooves, and hold them in place by an encircling strap. This work was accomplished under the most trying circumstances, the engineer having only hand tools, drills and cold chisels to work with, and being in a space exceedingly cramped. Before the insertion of the bolts a strap was passed around the shaft at the break and drawn tight by means of bolts. The three 5-inch bolts were then put in position, of course, parallel in the axis of the shaft and an outside strap bolted tightly between them. The entire work consumed about 72 hours, when the vessel proceeded on her journey at about half speed, landing in New York December 31.

### The Outlook for the Marquette Range.

A comparison of the outputs of 1891 and 1892 by ranges shows great gains by the Menominee and Gogebic ranges, even without the all-rail shipments. The Menominee range mines have shipped over half a million tons more of ore this year than last, while the Gogebic mines have increased their output a round million tons. The Vermillion range, which has practically but two mines, the Minnesota and the Chandler, has increased its output 261,209 tons. This range has shown a steady gain in production year by year since its first cargo was forwarded in 1884.

The Marquette range alone shows a falling off this year as compared with last, the decrease being 229,074 tons. The all-rail shipments of ore from this range smelted in local furnaces will lessen these figures perhaps 125,000 tons, but the fact remains that the output is fully 100,000 tons less than in 1891, and in 1891 there was a decrease of 497,614 tons from the previous year's production. As the Marquette range, says a correspondent of the *Cleveland Leader*, is by far the oldest, and probably the richest in ore of the four districts, these figures are surprising. The reasons for this falling off are several in number. From 1854 till 1877 the Marquette range was the entire Lake Superior district. In 1877 the Menominee range made its first shipment. In 1884 the Vermillion and Gogebic ranges entered the field as producers. The Marquette range has produced nearly one-half of the entire output of the lake district. For years the Jackson, Cleveland, Lake Superior, Champion and Republic mines, with a few smaller producers, controlled the market.

It is now difficult for their owners, after having a monopoly of the Bessemer ore production of the Union for so many years, to fully realize the fact that they are now being closely crowded by younger and even stronger rivals. Early this year the mines of the newer districts sold large quantities of ore for 1893 delivery at prices which seemed entirely inadequate to the managers of the Marquette County mines. The market was practically supplied by

these sales, and as a consequence the Marquette range mines were placed at a decided disadvantage later in the season, when they attempted to dispose of their product. Of the unsold ore now remaining at Lake Erie ports, fully 1,200,000 tons is from Marquette County mines, and much of it is still unsold. The Marquette mines were further placed at a disadvantage by the preference of the furnace men for soft Bessemer ores, such as form the larger part of the output of the other districts, especially of the Menominee and Gogebic mines. While this discrimination may be partly a "fad," there is a basis in reason for it, and some of the mines of this range propose to put their ores on an equal footing with the softer ones of other fields by crushing all their ore at the mines.

Some of the older mines of this range show signs of exhaustion. The Saginaw, which in its day has produced nearly 500,000 tons of ore, is abandoned. The Republic, once the banner producer, which has mined and marketed 8,907,083 tons of ore, is nearly worked out. Its stock, which sold at \$45 a share in 1890, is now quoted at \$9, with few bidders. The directors of the Republic have called a meeting for next month, at which the project of acquiring mineral lands in the new Mesaba district will be considered. If this change of base is made, the machinery will be removed and the mine "robbed" of its remaining ore deposits.

A pleasant little city of 3000 souls dependent on this mine alone will be left without support. Another big producer now idle is the Champion. It has mined 2,764,905 tons and has been very profitable to its owners till recently. A magnificent \$500,000 plant of machinery, one of the finest in the district, was placed in position at this property in 1890 and 1891. High freight rates, lack of cash in the treasury and an immense amount of ore in stock and unsold, decided the directors to suspend work, at least till spring, when it is hoped the mine will resume operations. The Michigan, also a large producer at one time, is also idle. The Humboldt, which has mined and shipped over 700,000 tons, is another Marquette County mine that is idle, with poor prospect of resumption at any early date.

The past season has been a hard one on the smaller mines of this range. The East New York, which has produced some 175,000 tons, is in the throes of dissolution, the pumps and machinery having been seized and the stockholders sued by the miners to recover wages due them. The American, output 108,305 tons, is also idle, as are a score of smaller mines, some of which never amounted to much, and others of which are hampered by lack of capital, high rail freights, or poor ore. The larger mines of the district, such as the Lake Angeline, Lake Superior and Buffalo, have increased their output this year. The Buffalo group, consisting of four mines east of Negaunee, have a credit of nearly 600,000 tons production this year, compared with 468,808 tons last year. This group is owned by the Schlesinger syndicate, a pool of wealthy Berlin capitalists, of which Ferdinand Schlesinger, of Milwaukee, is the manager. This syndicate, since its somewhat theatrical advent into mining circles in 1888, has always gone on the plan of producing each year every pound of ore that could be mined. The syndicate controls the Chapin, Dunn, and other rich mines on the Menominee range, as well as the Buffalo group, and their combined output for 1892 will not fall short of 1,500,000 tons.

It bids fair to be a very hard winter in Europe. The Rhine, Moselle, Neckar and Main rivers are frozen from shore to shore. In the United States rivers are frozen which have been navigable for years dur-

ing the entire season. The instinct of the beavers and muskrats, who made unusual preparation for a siege of cold weather, was correct.

## Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., January 3, 1893.

The chiefs of the different bureaus concerned in the designs and construction of the Hull engines, &c., under the proposals for the building of the new armored battleship and cruiser, "Iowa" and "Brooklyn," have submitted to the Secretary of the Navy the results of their comparison of the bids with the specifications. The awards, however, were not made to-day, although they are now expected every day. Irving N. Scott of San Francisco, the next lowest bidder, is still in the city, but says that he does not expect either of the ships, as the award is a matter of law and the Cramps are the lowest bidders. The law under which the ships were authorized made no special provision that one should be constructed on the Pacific coast.

The drift of talk in official circles indicates that both ships will go to the Cramp yards.

The Bureau of Steam Engineering has just completed a superb piece of drafting for the Columbian Fair at Chicago. It is in a frame of oak and gold 96 x 48 inches, being the size of the drawing. In the upper left corner in artistic hand lettering is the inscription—

Engine of

U. S. S. Powhatan, A. D. 1849.

On the upper right corner legend:

Engine of

U. S. S. Powhatan,

Designed by the Bureau of Steam Engineering, 1849.

Charles H. Hasewell, Engineer-in-Chief.  
Built by A. Mehaffy & Co., Norfolk, Va.

Horse-power, 1172; steam pressure, 15 pounds.

Total weight of machinery, 508 tons.

Weight per horse-power, 972 pounds.

Beneath the above—

Engine of

U. S. Torpedo Boat No. 2.

Designed by the Bureau of Steam Engineering, 1891.

George W. Melville, Engineer-in-Chief.  
Built by Iowa Iron Works, Dubuque, Iowa.

Horse-power, 1800; steam pressure, 250 pounds.

Total weight of machinery, 45 tons.

Weight per horse-power, 56 pounds.

The title is—

1849. Illustrations Showing the Advancement in Marine Engineering. 1891.

The drawings show the relative sizes of the engines, both being of the same scale—viz., 1 inch to the foot.

The relative size of the engines is:

Powhatan, 26 feet high, 39 feet long, 12 feet wide.

Torpedo boat, 7 feet high, 12½ feet long, 4½ feet wide.

The small engine has 50 per cent. more power than the large one.

The repair at sea of the fractured shaft of the ocean greyhound "Umbria" is the theme of earnest comment and compliment among the engineering experts of the Bureau of Steam Engineering, Navy Department. Engineer-in-Chief Melville has been closely studying the accounts and is

waiting for something scientific or technical on the subject.

He remarked to day: "The repair of the 'Umbria's' shaft was a remarkable piece of work. The difficulty of repair was increased by the size of the shaft, which was 24 inches in diameter. She also being in motion and the engines liable to move added to the delicacy of the operation. The drilling was extraordinary and the method applied novel and new. The engineer deserves every praise. This also shows the importance of efficiency in the engine department of a ship."

Chief Engineer N. P. Towne, in charge of the drafting department of the great ships of the navy, and also an authority, said: "The engineer who repaired the shaft made an excellent job and undoubtedly saved the ship."

It is proposed to make an investigation by studying up all the literature on the recent breaking of shafts, for the purpose of applying new methods of composition and manufacture to the shafts of the new ships. Some experiments will be made with nickel steel.

## The Mahoning and Shenango Valleys.

During the past year the changed conditions in the manufacture of iron have been severely felt by the puddlers of the Shenango Valley. A great many puddlers have been laid off. Steel from the new Shenango Valley Steel Works at New Castle is being used in large quantities, and as it makes a better quality of sheet and plate iron, and is almost as cheap as the puddled iron, the mill men in the valleys say the manufacture of the latter will be discontinued entirely.

The Sharon Iron Company will immediately erect two new sheet mills at their already large works at Sharon. The addition to the firm's business will necessitate the building of an iron structure, 110 x 145 feet in dimensions, and contracts will be awarded in a few days. The plant is to be one of the most modern in the country.

Grace Furnace of the Brier Hill Iron & Coal Company, at Brier Hill, Ohio, produced nearly 300 tons of Bessemer iron one day last week, and the December output was 8000 tons.

Several repairs are being made to the finishing departments of Andrews Brothers & Co.'s works at East Youngstown, and it is expected to resume operations in all departments the first of next week.

Last Wednesday a big 6-foot fly wheel, weighing 2000 pounds, burst in the 8-inch department of the Atlantic Iron Works, Sharon, throwing fragments of metal in every direction. The wheel was making 300 revolutions per minute when suddenly a quarter section broke and several pieces were hurled hundreds of yards away, but fortunately no one was hurt.

Quite a number of the furnaces in the Shenango Valley are putting in new boilers and can only realize a small sum from the sale of the old ones, so they have adopted a plan of sewerage in which they use the old boilers instead of brick for the conveyance of gas from the stock to the boilers and hot blast ovens. They find the old boilers far superior to brick and far cheaper than any other material.

The 12-inch mill of P. L. Kimberly & Co.'s mill at Sharon is idle for repairs to the machinery. It will resume work next week.

A report was circulated last week that the New York parties who are considering the purchase of the several rolling mills and blast furnaces in the Mahoning Valley had accepted the terms of the local firms, offering the plants at \$7,000,000, but a gentleman who is in a position to know all about the deal says that as yet nothing definite has been done toward

closing it up, and the prevailing opinion here is that it will not be consummated.

P. L. Kimberly, the leading iron and steel manufacturer of the Shenango Valley, has secured a lease of the Biwabik tract of 120 acres near Merritt, on the Mesaba range. He sank 39 test shafts at short intervals on this property, each one from 50 to 100 feet in Bessemer ore. None of them penetrated the ore to the bed rock. The depth of these pits was controlled by the fact that in 1891 and early last year there was no machinery in the district. Mr. Kimberly established the fact that the ore bed on the Biwabik property was from 50 to 100 feet thick and co-extensive with the boundary lines, and that the ore was covered with a deposit of sand and gravel and boulders from 8 to 30 feet thick. The problem for Mr. Kimberly to solve is how economically to mine the ore.

## The Foundrymen's Association.

Howard Evans, secretary, has issued the following:

The twentieth meeting of the Foundrymen's Association will be held at the Manufacturers' Club on Wednesday evening, January 4, 1893, at 8 o'clock.

Clemens Jones, M.E., late chemist of the Thomas Iron Company of Hokendauqua, Pa., will address the meeting on the subject of "The Relations of Chemistry to Foundry."

Bids will be received from foundrymen on the following castings, which were presented at the December meeting. These castings are still at the Manufacturers' Club for inspection:

No.	Pounds weight.	Pieces.
1. Hydrant cap.....	12	1,000
2. Railroad car box.....	60	500
3. Bearing for above box.....	10	1,000
4. Lid for same box.....	15	1,000
5. Pedestal for mines.....	17½	1,000
6. Pedestal for mines.....	8	1,000
7. Chair for duplex rail.....	27	1,500
8. Hook plate, No. 6.....	4	5,000
9. Manifold, No. 4.....	11	1,000
10. Rosette plate, No. 6.....	5	5,000
11. Elbow, 1 inch.....	1½	10,000
12. Hook plate, No. 1.....	14	10,000
13. Clothes hook.....	1-16	10,000
14. Jacquard plate.....	7½	5,000

We will be pleased to have you make a bid at which you will supply the different castings in lots as named. Your name will be known only as a member, so that your price will be kept in confidence.

Samples of coke will be presented with analysis for comparison, and a discussion upon the different kinds of coke will take place, which should be of interest to all foundrymen.

Please send a representative to this meeting, and put your bids in early that they may be scheduled. Make price for castings f.o.b. your shop. The patterns, flasks and core boxes will be supplied.

The Edith Furnace Company, operating Edith Furnace in Allegheny, Pa., have just finished using 1000 tons of Mountain iron ore from the Mesaba range, and with very gratifying success. Last week Edith Furnace made 1300 tons of No. 1 Bessemer iron.

The Philadelphia Natural Gas Company of Pittsburgh have purchased outright the plant and franchises of the Duquesne Natural Gas Company with headquarters in Pittsburgh. It is stated that the acquirement of this concern will add to the holdings of the Philadelphia Company about 15,000 acres of gas lands in Ohio and McCandless townships. There is also included in the purchase 8 miles of 8-inch pipe, 1 mile of 6-inch pipe and four producing wells, the average pressure of which is 140 pounds.

## MANUFACTURING.

### Iron and Steel.

The business heretofore conducted under the name of D. R. Lean, engineer and contractor, Penn Building, Pittsburgh, Pa., has been succeeded by a corporation to be known as the D. R. Lean Company. The change went into effect on January 1.

The annual meeting of the stockholders of the Columbia Iron & Steel Company of Uniontown, Pa., was held at that place last week. Robert Hogsett was elected president; Jos. C. Searight, vice-president; W. N. Kratzer, secretary; and M. H. Bowman, treasurer. A Board of Directors consisting of Jno. N. Ewing, C. Yeager, H. C. Rush, E. M. Butz and Nathaniel Ewing was elected. The statement of business done by this firm since its reorganization in September last met with the approval of the Board of Directors.

President H. M. Garland of the Amalgamated Association of Iron and Steel Workers was in Zanesville, Ohio, last week conferring with the officials of the Ohio Iron Company of that place, with a view of bringing about, if possible, a settlement of the difficulties which have existed between that firm and the Amalgamated Association for nearly two years past. Liberal concessions were offered the firm by Mr. Garland if they would consent to sign the Amalgamated scale, but the firm refused all overtures and announced that hereafter all their employees would be treated as individuals and no labor organization of any kind would be recognized. The plant of this firm is now in full operation with non-union men, and the tonnage is said to be as large as at any time in its history.

The Bessemer Steel Works, Troy, N. Y., have been closed down for an indefinite time.

The Burden Iron Works, Troy, N. Y., have opened again, having been closed a week.

The work of remodeling the Henderson steel plant at Birmingham, Ala., has been completed and it is stated that it will be put in operation at an early day. It will be controlled and operated by the Jefferson Steel Company.

It is stated that the Irondale Furnace at Irondale, W. Va., will go into blast early after the first of the year. This property is owned by Col. F. Nemegyei of New York City.

An effort is being made, with good prospects of success, to reorganize the company owning the rolling mill at Helena, Ala., and put the plant in operation.

Arrangements are being perfected for placing the Bessemer Rolling Mill at Bessemer, Ala., in operation.

It is stated that the Watts Furnace at Middlesborough, Ky., will go into blast shortly after the first of the year. Work is being pushed as rapidly as possible and a supply of ore is now being received.

A large force of hands are engaged making extensive improvements on the North Alabama Furnace, at Florence, Ala., which was recently purchased by the Spathe Iron Company of Nashville. As soon as the improvements are completed the furnace will be put in operation.

The New England Steel Works of Worcester announce they have completed a plant for the manufacture of open-hearth steel castings. W. M. Horne & Co. of 6 Oliver street, Boston, are the general sales agents.

The blast furnace of the Youngstown Steel Company, at Brier Hill, Ohio, has been doing excellent work since it was put in operation about one month since. As is well known, this firm used the direct process, running their casts of Bessemer pig directly into the cupola of their washed metal steel plant, which is located just beside the furnace.

The Norristown Furnace, at Norristown, Pa., formerly operated under lease by Isaac McHose & Sons, was blown in on New Year's day by the Norristown Furnace Company.

Isabella Furnace, Wyebrooke, Chester County, Pa., has blown out on account of the stock of charcoal being exhausted. William M. Potts, manager, states that the furnace will probably not go in blast again for six to eight months.

As announced in these columns several weeks since, the Carbon Steel Company, of Pittsburgh, have completed the erection of a new plate mill which includes every modern improvement, and gives this firm exceptional facilities for the manufacture of steel plates. In addition to this, the equipment of the firm includes a universal mill, and a small plate mill, with a total output of 300 tons per day. The Carbon Steel Company makes open-hearth steel plates exclusively. This firm will be represented in Cleveland from this time forward by Condit-Fuller Company of that city.

The plant of the Kittanning Iron Company, at Kittanning, Pa., manufacturers of muck iron exclusively, is idle at the present time, but is expected to resume operations some time during January.

Announcement is made that the Wheeling Steel & Iron Company have arranged a new wage scale to govern the Wheeling Steel Works located at Benwood, W. Va.

Claire Furnace, at Sharpsville, Pa., will go into blast on the 15th inst. It was blown out August 19.

The Lone Star Iron Company's furnace, at Jefferson, Texas, blew in on the 1st inst., after an idleness of eight months.

No 2 Eureka Furnace, at Wyandotte, Mich., was blown out on December 20. Both furnaces are now idle.

### Machinery.

William Tod & Co., Youngstown, Ohio, have just shipped to the Pennsylvania Steel Company, Steelton, Pa., the engine for driving their new universal slabbing mill. The power for this purpose includes two pairs of reversing engines on one foundation, with the frames all rigidly connected together, and arranged so as to be operated by one engineer. The pair connected to the horizontal rolls has cylinders 42 x 60 inches, and the vertical rolls are driven by a pair of 26 x 30 inch engines. Tod & Co. are also getting ready for shipment two engines 28 x 42 inch and 36 x 48 inch for the new tin-plate works of the Falcon Iron & Nail Company, Niles, Ohio; a 30 x 48-inch for the Ellwood Steel Company of Ellwood City, Pa.; a 36 x 48-inch for the Riverside Iron Works of Wheeling, W. Va., and a 30 x 36-inch for the Carnegie Steel Company, Limited, at Homestead, Pa. In the shops of Tod & Co. for delivery in the spring are two blast furnace engines for the Youngstown Steel Company, one for the Union Rolling Mill Company of Cleveland, and one for the West Duluth Furnace; two cross compound high pressure pumps to deliver 30,000 gallons of water per hour at a pressure of 3500 pounds per square inch, for the United States Projectile Company of Brooklyn, and the usual amount of smaller work. Tod & Co. report inquiry for machinery of their class as being quite satisfactory.

It is reported that the Lowville, N. Y., Iron Works are to remove to Niagara Falls, N. Y. J. T. Horton, of the concern, has been in the city and it is said that he has discussed commodious buildings with contractors. The company's specialty at present is the manufacture of pulp mill machinery.

The Ranton Boiler Company are considering the matter of removing from Syracuse to Utica, N. Y., where they say their boilers can be manufactured cheaper. If they receive an offer from the Utica Merchants' and Manufacturers' Exchange they will probably increase their capital stock. A committee has been appointed by the Exchange to inspect the boiler company's plant.

The brass foundry of W. Harris, at Lockport, N. Y., was destroyed by fire December 20. The loss is not large.

The Vickers Mfg. Company of Castleton, N. Y., have been incorporated, with a capital of \$8000 to manufacture and sell ice machinery, tools and implements. The directors are: William H. M. Smith, Clarence Lanan and Charles J. Keller. There are 325 shares at \$25 each.

The New York Central Railroad shops, at Syracuse, N. Y., will be moved to Depew, near Buffalo, about February 1.

The Maddox Wire Belting Company of Cooperstown, N. Y., will locate at Hope Mill, near that place. The \$15,000 capital stock asked for is nearly all subscribed, mainly by Cooperstown capitalists. The company has a capital of \$75,000.

A large foundry and machine shop is to be erected at Camden, Ark., by W. H. Adams and associates.

The Enterprise Machine Works, Chattanooga, Tenn., are building an addition to their plant and will add some new iron working machinery.

A. B. Bowman, D. S. McIntyre and associates have organized the Valley Machine Company, at Johnson City, Tenn., and will erect a plant for the manufacture of drills, rakes and all kinds of farming implements.

W. M. Hoffman will establish a plant at Belton, Texas, by David Wood, J. W. Sivewright and associates.

The Pittsburgh Gauge Company, with a capital stock of \$50,000, were granted a charter of incorporation last week. The incorporators are W. L. Rodgers, E. N. Alsop, R. H. Binns and J. R. McCreery. This new concern suc-

ceeds to the business of the Williams Indicator & Gauge Alarm Company, manufacturers of Williams' Patent High and Low Water Indicators and Alarm and Williams' Rotating Gauge Cocks.

### Hardware.

The Rider Gun Company, with a capital stock of \$60,000, has been incorporated at Columbus, Ohio, for the purpose of engaging in the manufacture of hammerless breech-loading shot guns, magazine pistols and single-shot rifles. The incorporators are George J. Atkinson, Horace Park, Frank N. Beebe, W. H. Miller and Chas. A. Thomas.

The United States Lock Company, with a capital of \$600,000, have been incorporated by Chas. Zimmer, L. R. Luebert and others, at Newport, Ky.

The American Knife & Razor Company, St. Louis, Mo., have been incorporated with a capital stock of \$15,000. They will handle cutlery of every description, and have adopted as a trade-mark the words "Primo-Grade."

Contracts have been let for the factory building to be used by the Alpine Heights Cutlery Company, at Alpine Heights, near Chicago. The building is 80 x 40 and three stories. Forty men will be employed.

### Miscellaneous.

A. E. Barton, superintendent of the Ensley Division of the Tennessee Coal, Iron & Railroad Company, at Ensley, Ala., reports to the Union Mining Company of Mount Savage, Md., that No. 4 Furnace, which was lined throughout with Mount Savage brick, ran 1668 consecutive days on one lining. It made 175,266 tons of pig iron, an average of 105 tons per day. The number of days mentioned included nine days' idleness due to short extraordinary stoppages.

The Berlin Iron Bridge Company of East Berlin, Conn., have secured the contract for a new iron fire-proof storehouse for the Pope Mfg. Company, at Hartford, Conn. The building will be 40 feet wide by 84 feet in length, two stories high, and will be used for storing the separate parts of bicycles.

It is reported that the Canton Steel Roofing Company of Canton, Ohio, whose plant was completely destroyed by fire week before last, will rebuild their works at Ellwood City, Pa. The proximity of Ellwood City to Pittsburgh, where ample supplies of steel plates and sheets can be secured, is put forward as one of the reasons for the probable change in location.

Maw Belting Company of Philadelphia have had a very full year's business and commence 1893 with a nice list of orders on their books. The belting made by this company is specially adapted for heavy work, and is said to be unaffected by either heat, steam or water. They recently shipped a belt 108 inches wide and have a continuous run of orders for 72 inches and upward.

The Indianola Mfg. & Power Company have been organized at Charleston, S. C., with a capital of \$500,000 to develop the water powers in Chester County, erect mills, &c. Wm. A. Courtenay, Francis J. Felzer and associates, incorporators.

Among recently authorized corporations in Illinois are the following: The United States Stoker and Anti-Clinker Grate Bar Company, Chicago; capital stock, \$1,000,000; incorporators, Charles E. Bean, Fred S. Bean, Watson Ryder and Frank W. Blair. Charles Kaestner & Co., Chicago; capital stock, \$300,000; for the manufacture of machinery; incorporators, Charles Kaestner, Robert L. Tatham and Timothy F. Mullin. Chicago Facing Mills, Chicago; capital stock, \$50,000; incorporators, Samuel J. Sloan, Carroll B. Kinsey and Arthur F. Leslie. The Snow Windmill Company, Batavia; capital stock, \$50,000; incorporators, Franklin L. Chase, Joseph W. Eliel and W. C. Hawley. The Caloric Furnace Company, Chicago; capital stock, \$500,000; incorporators, Charles K. Pickles, E. J. Stannus and Aug. Borlinghaus. The Dealers' Steel Fence Company, East St. Louis; capital stock, \$300,000; incorporators, William R. Faxon, Henry F. Vogle and Frank G. Rhodes. The Folding Clothes Dryer Company, Chicago; capital stock, \$50,000; incorporators, Robert P. Lake, Alexander H. Lake and Ashley C. Smith. Chicago Foundry and Machine Works, Chicago; capital stock, \$100,000; incorporators, C. W. Poorman, J. F. Koons and A. L. Koons. The Rotary Weaving Machine Company, Rockford; capital stock, \$100,000; incorporators, Carl A. Newberg, Jacob P. Peterson and Victor Johnson. The Manufacturers' Malleable Iron & Steel Casting Company, Chicago; capital stock, \$5,000,000; incorporators, A. J. Burbank, George Bell and H. E. Stover. The Columbus Ornamental Iron Manufacturing Company, Chicago; capital stock, \$25,000; incorporators, Paul Seidel, C. Coline and Nicholas Michels.

## TRADE REPORT.

Very little need be said concerning developments in the Iron and Steel markets during the past week. There have been very few transactions of magnitude to test the market in any line or in any leading distributing center.

The influences which shaped the course of prices during the past year are reviewed in the annual reports of our Philadelphia and Chicago correspondents, which we print elsewhere, while our supplement graphically represents the fluctuations in prices in raw materials, and in finished articles and in metals.

The consensus of opinion, so far as the coming year is concerned, seems to be that for many months to come nothing but a low range of values can be expected. The Iron and allied trades are expected to share largely in the general quickening of commerce which is likely to develop in certain directions as one of the effects of the World's Fair. Conservative business men are nervous, however, concerning the possibility of an invasion of cholera. Another question which is beginning to come forward as a possible disturbing factor is the danger of a premium on gold.

So far as the Iron trade proper is concerned, the principal argument for a continuance of low prices is based on the prediction that Lake Ores will be very cheap this year. First of all, it is undoubtedly true that considerable quantities of Ore now on the docks at lower lake ports remain unsold. That is conceded by the mining interests themselves. The point is made, however, that relatively little Bessemer Ore is unsold on the docks. If this be true, then there is sure to be a pressure on the non-Bessemer varieties, which will react on Gray Forge Pig and crowd down Muck Bar, thus helping the puddling furnace in its struggle with the Bessemer converter.

The principal cause for the cheapening of Bessemer Lake Ore for the coming year must be sought in the invasion of the markets by the product of the Mesaba range. These new Ores must fight their way into favor. For the present they can be very cheaply mined, and it is intimated that \$3.75 at Cleveland is expected to be the selling price. This may crowd a good many of the weaker miners in the older ranges to the wall, but even then the market is likely to be heavily supplied. The most conservative estimates of the 1893 Mesaba Ore product place it at 750,000 tons, this figure being based rather on the probability of inadequate transportation facilities than upon the producing capacity of the mines.

Should developments in the Lake Ore markets take this course, which can be interfered with only by labor disturbances, then the producers west of the Allegheny Mountains will possess a tremendous advantage. They are likely to become fiercer competitors than ever before in Eastern markets in all Soft Steel products. They will probably crowd the Southern Pig Iron makers back from markets which they have thus far invaded. The Southern producers may then be expected to put even greater pressure upon the markets east of the Allegheny Mountains.

Relief can apparently come only through a continuance of the enormous consumption of this country, encouraged by low values. It is in this direction that prospects are brightest. Comparatively little increase is expected from the Steel Rail trade, since financial matters are not in such shape as to encourage much construction of new mileage. But the outlook in engineering construction, in architectural work and in the general trade is regarded as excellent.

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street,  
CHICAGO, January 4, 1893.

The New Year starts off very quietly and there is but little doing in any line. Everybody appears to be waiting for something to turn up. Conditions are very different from what they were at the beginning of last year, when general hopefulness prevailed and expectations of higher prices were generally entertained. Nobody now looks for higher prices, but at the same time values are at such a low point that there is little if any fear of their going off to any extent. What sellers would like to see is plenty of business, and this is not promised in the near future.

**Pig Iron.**—Trade at present is confined almost entirely to small lots which are wanted for immediate delivery. Inquiries are in the market for good sized quantities of local Coke Iron, and the hope is expressed that trade in this line will develop actively as the new year advances. Negotiations are of a limited character, however, and sellers have not as much on which to base their hopes as they expected in December. Southern Iron is in even less demand, very few inquiries being noted and sales running very light even for this season. Prices are quite firmly maintained, sellers refusing to make even a concession of 25¢, at which it would appear to be possible to do some business. Lake Superior Charcoal is in the same condition as other Iron, and although makers look forward to a heavy consumption this year they are not able at present to point to much business in actual prospect. From present indications buying will be only spasmodic until toward May, when the malleable manufacturers will again be in the market for large quantities, perhaps considerably larger than in previous years. The foundries are enjoying excellent trade, and consuming Iron to a greater extent than at any time during the past year, with a very favorable outlook for some time to come. Reports indicate that stocks at the various furnaces were still further reduced during the month, thus putting producers in a better position to maintain prices. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal.....	\$16.50 @ \$17.00
Local Coke Foundry, No. 1.....	13.75 @ 14.25
Local Coke Foundry, No. 2.....	13.50 @ 14.00
Local Coke Foundry, No. 3.....	13.25 @ 13.75
Local Scooch.....	14.50 @ 15.00
Ohio Strong Softeners.....	16.25 @ 17.00
Southern Coke, No. 1.....	14.75 @ 15.25
Southern Coke, No. 2.....	13.00 @ 14.00
Southern Coke, No. 3.....	13.10 @ 13.25
Southern, No. 1, Soft.....	13.35 @ 13.50
Southern, No. 2, Soft.....	13.00 @ 13.25
Southern Gray Forge.....	12.85 @ 13.10
Southern Mottled.....	12.50 @ 12.75
Tennessee Charcoal, No. 1.....	16.50 @ 17.50
Alabama Car Wheel.....	19.50 @ 20.50
Coke Bessemer.....	14.50 @ 15.00
Hocking Valley, No. 1.....	17.00 @ 17.50
Jackson County Silver.....	17.00 @ 17.50

**Manufactured Iron and Steel.**—Nothing has occurred during the past week of any special consequence in finished products, except orders which were placed for Bar Iron for car work. Business of this kind continues active, covering about three-fourths of the present entire demand for Bars. The market is a little weaker and 1.60¢, Chicago, appears to be the prevailing rate except for very small orders. Soft Steel Bars are unchanged at 1.70¢ @ 1.75¢, Chicago. The Pittsburgh Bridge Company secured the contract of the Halstead street bridge, which is to be 130 feet in the clear and is so constructed as to be raised 160 feet above the Chicago River by hydraulic power. Beams continue to be quoted for Chicago delivery in mill lots at 2.17½¢ @ 2.25¢; Angles, 1.90¢ @ 1.95¢; Universal Plates, 1.90¢ @ 1.95¢; Sheared Plates, 2¢ @ 2.10¢. Plates are quiet, with mill lots

quoted at 2¢ @ 2.10¢ for Tank Steel, with corresponding rates on other grades. Sheets are not in much demand at present, contracts being scarce just now and car-load orders running light. Black Sheets continue to be quoted on a basis of 2.95¢, Chicago, for No. 27. Some inquiry is noted for Galvanized Iron, with prices running as before. Merchant Steel is also quiet, but mills are still full of work and prices are well maintained.

**Rails and Track Supplies.**—Local manufacturers have reduced the price of standard sections of Steel Rails to \$30, to correspond with reductions made in Eastern prices. Negotiations for considerable tonnage for forward delivery are under way and it is expected that this month will see a good amount of business secured for winter and spring work. Little is doing in Track Fastenings, on which prices are unchanged.

**Scrap.**—The trade has been light since our last report and dealers quote unchanged prices.

**Metals**—Lake Copper is quoted at 12½¢ for carload lots, and Casting brands 11½¢. Prime Western brands Spelter are still quoted at 4.20¢ here. Pig Lead is a little stiffer, and on the little business now being done prices range from 3.60¢ to 3.70¢.

## Pittsburgh.

Office of *The Iron Age*, Hamilton Building,  
PITTSBURGH, January 3, 1893.

**Pig Iron.**—Probably never in the history of the trade has it been as difficult to give quotations which will correctly represent prices ruling for Bessemer and Gray Forge Iron as it is at this time. The principal reason for this lies in the fact that for considerably more than a month past sales have been restricted almost entirely to small lots ranging from 100 to 500 tons, with an occasional lot of 1000 or 1500 changing hands. Should a large order for Bessemer be placed at this time, it is difficult to say just what price would be accepted. For small lots involving from 100 to 500 tons, \$18.60 @ \$18.65, f.o.b. cars Pittsburgh, seems to be the ruling price, with occasional sale reported at \$18.70, Pittsburgh. The market on Gray Forge Iron continues to be greatly disturbed by a report of a large block changing hands recently at a very low figure. It is stated that the amount was 5000 tons and it was sold on a basis of \$12.25, Pittsburgh. This is 25¢ @ ton less than the established price of Gray Forge Iron, and has naturally unsettled the market to a very great extent. The parties who are reported as having made the sale, and also the concern reported as having bought the Iron, both strenuously deny that the transaction took place. However, it is now reported that three or four makers of Gray Forge in this vicinity have decided to meet this price, if necessary to do so, in order to market their product. However, the market on Gray Forge is ranging from \$12.35 to \$12.50, with \$12.40, f.o.b. cars Pittsburgh, as the ruling price.

As to the immediate future of the market very little can be said at this time. It is the belief, however, that buying during January will be much heavier than during December, which was probably the lightest month in the history of the trade. No immediate change for the better in prices of either Gray Forge or Bessemer Iron is expected. Should the demand increase very materially, and the report of make and stocks for December be favorable, it may serve to stiffen up prices to some extent. We quote the market as follows:

Neutral Gray Forge.....	\$12.35 @ \$12.50, cash.
All-Ore Mill.....	12.50 @ 12.75, "
No. 1 Foundry.....	14.00 @ 14.10, "
No. 2 Foundry.....	12.00 @ 13.10, "
Charcoal Foundry No. 1.....	19.00 @ 20.00, "
Charcoal Foundry No. 2.....	18.50 @ 19.00, "
Bessemer Iron.....	13.00 @ 13.75, "

We note a sale of 500 tons of Bessemer for January and February, delivered, on a basis of \$18.65, f.o.b. cars Pittsburgh.

**Billets.**—The market continues quiet and featureless. An improved demand, however, during January is looked for, as several concerns who have been feeling the market for some little time past are expected to buy, in limited quantities at least, before this month is out. The report of production of Billets at Duquesne, printed in *The Iron Age* of December 15, has caused considerable comment here, as the record is looked upon as a marvelous one. The Wheeling Steel & Iron Company, operating the Wheeling Steel Works at Benwood, W. Va., have arranged a wage scale with their employees for the year ending December 31, 1893. This concern do not recognize either the Amalgamated Association or the Knights of Labor, and as a consequence are not troubled with visits from committees as other concerns are who recognize these labor organizations. In regard to prices it can be safely stated that they continue weak, with very little business doing. Some concerns in this city continue sold up and state that they are not meeting low prices offered by other concerns, who are not so favorably situated with business. As near as can be ascertained the few lots changing hands are based on prices equal to about \$21.75 @ \$22, f.o.b. cars Pittsburgh. We note a sale of 1200 tons at the first-named price.

**Steel Rails.**—After a shut down of ten days for repairs Edgar Thomson started up on Monday morning, the 2d inst., on Rails. We are advised that the reduction of \$1 per ton in price has stimulated demand to some extent, and a number of orders that were being held in abeyance are expected to be closed up during this month. We continue to quote \$29 at mill for standard sections.

**Ferromanganese.**—Prices have weakened to some extent, and we now quote 80% Ferro at \$61, delivered at buyer's mill, and note a sale of 300 tons at that price. A mill in eastern Pennsylvania has recently entered Pittsburgh market as a seller of Ferromanganese, and is reported as having offered this material on a basis of \$60, f.o.b. cars Pittsburgh.

**Structural Material.**—The conditions governing this market are about the same as noted for several weeks past, only a fair demand going and for small lots. Considerable bridge work and elevated railroad work is in sight, and the demand for Structural Material for this year is expected to be very large, principally on account of low prices ruling. The following prices about represent what is being obtained for small lots: Beams and Channels, 2¢ @ 2.10¢; Angles, 1.70¢ @ 1.80¢; Universal Mill Plates, 1.70¢ @ 1.75¢; Z Bars, 1.90¢, and Tees, 2.10¢ @ 2.15¢.

**Steel Plates.**—A quiet business is being done in small lots, but an improved demand is expected from this time forward, as some concerns are reported as having delayed placing orders until after the opening of the new year. Prices have not materially changed since our report of last week, and for small lots the market is ruling about as follows: Bridge Plates, 1.90¢ @ 2¢; Flange, 2.05¢ @ 2.15¢; Fire Box, 8.40¢ @ 3.45¢; Tank, 1.70¢ @ 1.80¢; Shell, 1.95¢ @ 2.10¢. These prices would no doubt be shaded where large blocks are involved.

**Wire and Cut Nails.**—We continue to report a very moderate demand, and prices during the week under review have weakened to some extent, and we now quote Wire Nails at \$1.40 base, f.o.b. cars, Pittsburgh. In Cut Nails the situation is even worse as far as the demand is concerned, and no material improvement can be reasonably expected until outside

building operations can be resumed. We quote Cut Nails at \$1.42½ @ \$1.45 on a 30¢ average, f.o.b. cars in Wheeling district.

**Muck Bars.**—The demand continues quiet, and as considerable material is being put on the market, prices are weak and liable to go still lower. We note a sale of 500 tons at a price equal to about \$24.25, f.o.b. cars Pittsburgh. We quote the market at \$24, Pittsburgh, for best grades of Muck Bars.

**Wire Rods.**—A few sales are reported as having been made for delivery in the early part of this year, but outside of this very little business is doing. Prices are about as quoted for several weeks past, and we repeat quotation of last week of \$30.50, f.o.b. cars Pittsburgh.

**Merchant Steel.**—A fair amount of business is going in small orders, and, as we remarked last week, there appears to be a better demand for Plow Steel at this time than for other grades. Prices remain as given last week, and we quote as follows: Open Hearth Spring and Machinery at 2¢ @ 2.15¢; Machine Straightened Tire Steel, 2¢; Ordinary Tire Steel, not straightened, 1.80¢ base, Sleigh Shoe, flat bars, 2¢; Plow Steel, 2¢ @ 2.10¢, and Tool Steel 6¢ and upward.

**Merchant Bars.**—A good many mills are closed at this time, and unless an improved demand springs up about the time these repairs are completed, it is very likely that a number of concerns will remain closed down or only partially resume operations. There is no denying the fact that makers are considerably disappointed over the large falling off in demand, and also with the very poor prospect of any improvement in the near future. As a consequence of the falling off in demand prices are weak and new business being offered is being taken at very close figures. We quote No. 1 Bars at 1.60¢ @ 1.65¢, while Old Rail and Scrap Bars may be quoted at 1.45¢ @ 1.50¢. Reports are going that these prices have been shaded to some extent recently.

**Skelp Iron.**—Orders coming in continue to call for small lots only, and no improvement in demand can be expected until spring weather comes, which will allow outside pipe laying. Prices are weak, and 1.52½¢ @ 1.55¢ for Grooved and 1.70¢ @ 1.75¢ for Sheared about represent what is being obtained for small lots.

**Sheets.**—There is nothing new to report this week, and only a moderate amount of new business is being offered. Prices are about as quoted last week, as follows: No. 24 at 2.65¢ @ 2.70¢; No. 26 at 2.70¢ @ 2.80¢ and No. 27 at 2.85¢ @ 2.90¢. Soft Steel Sheets bring a slight advance on these prices.

**Pipes and Tubes.**—The conditions governing this market are about the same as noted last week. A small demand is going, and makers advise us that this will continue to be the case for some time to come. Discounts are unchanged and remain as follows: Black, Butt-Weld, 55 and 10%; Lap, 65 and 10%; Galvanized, Butt Weld, 47½ and 10%; Lap, 55 and 10%; Boiler Tubes, all sizes, 65%; Screw and Socket Casing, 62½%; Inserted Joint Casing, 57½%. It is no longer denied that these discounts are being materially shaded for desirable orders.

**Barb Wire.**—Very little is doing, although makers expect that buyers will soon commence to place their spring orders. Prices are about as given last week and we quote Painted Barb Wire at 2¢ and Galvanized at 2.40¢, with a slight advance for less than carload lots.

**Scrap Iron and Steel.**—Nothing is doing, and it is impossible to give prices that will correctly represent the Scrap

market. In the absence of sales we quote No. 1 Railroad Wrought Scrap at \$15 per net ton; Cast Iron Borings at \$7.50 per gross ton and Wrought Iron Turnings at \$11 per net ton. Leaf Springs appear to be in better demand than other kinds of Scrap, and we quote these at \$20.50 per gross ton, and Coil Springs we quote at \$17.50 per gross ton. Old Iron Axles may be fairly quoted at \$21, delivered in Mahoning Valley.

**Old Iron Rails.**—As yet no business worthy of mention is being done, and prices are very irregular. Short Steel Rails not over 6 feet in length may be quoted at \$15 and long lengths at \$15.50. There is no demand for miscellaneous lengths, and we make nominal quotations on these of \$15. Occasionally a few lots of Old Iron Rails change hands, and these may be fairly quoted on a basis of \$21, delivered in Mahoning Valley.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., January 3, 1893.

The year 1892 has passed into history as the one in which prices of Iron and Steel were lower than at any previous time of which there is any record. The volume of business was large, probably not quite up to one or two previous years, but if the Steel Rail trade had been in proportion with other branches, 1892 would doubtless have been the banner year. But it is a curious anomaly that nearly everybody complained of dull times. Not only were prices low, but it was exceedingly difficult to keep full of orders. The inference from this is that capacity for production has outrun consumption, and that the desire to keep well in the front rank caused extraordinary competition. But even this was irregular; during some portion of the year Pig metal was the point of attack, at other times it was Steel Billets, and at still other times Plates and Shapes were subject to violent competition. During these periods the lowest figures on record were reached.

Gray Forge Pig Iron at \$12.50, No. 1 Foundry at \$14.25, Steel Billets at \$24. Steel Plates at 1.75¢, Philadelphia delivery, are figures which up to 1892 were certainly unknown. Then came the reaction, somewhat faint in Pig Iron, but owing to strikes in the West, very decided in Finished Material. The advance in Pig Iron was about 50¢, in some cases a little more, but the average was not over 50¢. Steel Billets from the lowest point advanced \$3 per ton, Plates about \$5, but toward the close of the year everything began to slide back, and it is doubtful if business of any importance could be done to-day at any appreciable advance over the bottom prices of last year. Nominally sellers ask about 50¢ more on Pig Iron and Steel Billets, and about 10¢ more on Plates, but there is only a limited demand, and before things begin to move with any degree of activity it is more than likely that prices will have to be shaded a little. As a matter of fact, it is beginning to be realized that current quotations are likely to be a fair average of what may be expected hereafter, sometimes a little more, sometimes a little less, but not likely to average more except under special circumstances. The only thing that is likely to impart any very decided strength to the market is an increased demand for Steel Rails. A year ago the best authorities in the trade figured on a demand for 1,750,000 to 2,000,000 tons for 1892; the actual business, however, proved to be very little over 1,250,000 tons, although it was a reasonably prosperous year for the railways. This shows how very wide of the mark estimates may be, and in this instance, at all events, nothing unfavorable

intervened to offset expert calculations. It may perhaps be fair to infer that, as the railways bought less than expected during 1892, the deficiency will have to be made up during 1893, and especially because of the generally favorable results of last year's business. This is about the only factor likely to bring any very marked improvement to the Iron trade during the year upon which we have just entered, although in the general outlook the World's Fair will be a factor of considerable importance. Its general effects may be summed up thus: A very large increase in the foreign travel to this country, the travelers being mainly of the classes who are able to spend freely; a very considerable curtailment of the annual exodus of Americans to Europe, who will spend in travel here what they would have spent there; a large increase in the passenger traffic of all our railroads, but chiefly on the great systems which center at Chicago; and, since there cannot be any great movement of people without a corresponding movement of freight for their sustenance, a relatively large increase in freight traffic on the same roads. Against this must be set the withdrawal of a large portion of the population from their ordinary business while holiday making. That this has an important influence on railroad business was demonstrated recently when vast crowds flocked to Chicago to the dedication ceremonies. Railroad managers were astonished at the way business fell off in certain sections and departments, while increasing in others. It follows, therefore, that the increased activity of the movement which the World's Fair will cause cannot be set down as all gain. But that the gain will be very great goes without saying. Indirectly, it is safe to assume that the fair will give a considerable impetus to foreign investment here, since it will display in the most striking way before the eyes of the moneyed classes of Europe the magnificent opportunities for the profitable employment of money which this country presents. On the whole, therefore, the outlook for 1893 is not unfavorable, and while low prices are regarded as among the strong probabilities, there is at least a possibility of a much larger business than people are inclined to expect, in which case there may be an equally agreeable surprise in the matter of prices.

**Pig Iron.**—There is not much room for comment in regard to prices during the year just closed, as they were uniformly low, the extreme point of depression being reached during the months of July, August and September. Prices opened in January, 1892, at about \$1.50 to \$2 better than could be realized during the month just closed, and from \$2 to \$3 better than was obtainable during the summer months. December, 1890, showed the weekly output to be the largest on record up to that time. Production kept on increasing during the three following months, reaching in March the enormous aggregate of 194,000 tons. This, as might be expected, was the last straw that broke the camel's back, and from that date on until October there was a very rapid curtailment, a difference in fact within six months of about 42,000 tons per week. From the course of the market during the past year it may be inferred that 190,000 tons per week is more than the market will take and that 160,000 tons is below its requirements, so that if consumption during the next six months averages about the same as during 1892 the present average output of 175,000 per week ought to keep prices pretty steady. The decline in prices was simultaneous with the increase of production beyond 180,000 tons, the recovery was also simultaneous with the decrease in production below 160,000 tons. That is to say, prices begin to

weaken when production is over 180,000 tons, and begin to stiffen when it gets below 160,000 tons. It is therefore fair to presume that our normal consumption will average about 175,000 tons per week. Any material falling off from that tonnage will be likely to affect prices unfavorably, and on the same basis, any marked increase in consumption will also be likely to influence them in the opposite direction. The monthly reports of furnaces in blast ought therefore to be a fairly correct indication of the course of the market from time to time. From present appearances there is nothing to suggest any material departure from the conditions recently prevailing. The Steel Rail trade is liable to become a factor of some importance, but that interest has been dormant so long that the trade almost entirely ignore it. All the same, some of these days it will surprise people, when they least expect it. Meanwhile many important changes are being worked out. Steel is usurping Iron to such an extent that the demand for Gray Forge is almost a thing of the past. A few local furnaces, with one or two in Virginia, virtually supply all the first-class Mill Irons that are called for in eastern Pennsylvania, while the foundry trade, which is rapidly extending, absorbs Iron from all parts of the country. Some local brands still retain their former high reputation, but they no longer have a monopoly. Western Pennsylvania (to some extent Ohio), Alabama and Virginia are all contributors to this market, and are supposed to be here permanently. Some of these brands from a distance find a market because of their superior quality, others because of their low prices, each particular brand having become fairly well known for its distinguishing feature, either in price or quality. In regard to prices during the coming year, it is hardly possible to form any very decided opinion, except that they are likely to rule very low. There is some prospect of a lower cost of production, apart from which we should be rather inclined to expect a slight improvement, but under present conditions it will require a good deal of heavy buying to impart either strength or vigor to the market. In any case, matters are in such a shape that consumers have no fears of being taken unawares, and this, in fact, is one reason why there is so little variation in prices. There is not enough concerted buying to put prices up, but, on the other hand, consumers are so dependent on the frequent renewal of their purchases that they have no chance to go down. The extreme limits of quotations have, as we said before, been about 50¢ below the figures of to-day, and at the highest from \$1 to \$2 above them, as shown by the following, which were current quotations in Philadelphia at the beginning of each month in the year:

## JANUARY, 1892.

Standard Penna., No. 1x	\$17.50 @ \$18.00
Standard Penna., No. 2x	16.00 @ 16.50
Standard Virginia, No. 1x	16.00 @ 17.00
Standard Virginia, No. 2x	15.00 @ 15.75
Standard Penna. and Virginia Forge	14.25 @ 15.00
Ordinary Forge	18.50 @ 14.00

## FEBRUARY.

Standard Penna. (Lake Ore), No. 1x	\$17.50 @ \$17.75
Standard Penna. (Lake Ore), No. 2x	16.50 @ 16.75
Standard Virginia, No. 1x	17.00 @ 17.25
Standard Virginia, No. 2x	16.00 @ 16.25
Standard Penna. and Virginia Forge	15.00 @ 15.25
Ordinary Forge	14.00 @ 14.50

## MARCH.

Standard Penna. (Lake Ore), No. 1x	\$17.25 @ \$17.50
Standard Penna. (Lake Ore), No. 2x	15.75 @ 16.00
Standard Virginia, No. 1x	16.50 @ 17.00
Standard Virginia, No. 2x	15.00 @ 15.50
Standard Penna. and Virginia Forge	14.50 @ 15.00
Ordinary Forge	13.50 @ 13.75

## APRIL.

Standard Penna. (Lake Ore), No. 1x	\$16.50 @ \$17.00
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Standard Penna. (Lake Ore), No. 2x	15.00 @ 15.50
Standard Virginia, No. 1x	15.25 @ 16.00
Standard Virginia, No. 2x	14.50 @ 15.00
Standard Penna. and Virginia Forge	14.00 @ 14.50
Ordinary Forge	13.00 @ 13.25

## MAY.

Standard Penna. (Lake Ore), No. 1x	\$16.50 @ \$17.00
Standard Penna. (Lake Ore), No. 2x	15.00 @ 15.50
Standard Virginia, No. 1x	15.25 @ 16.00
Standard Virginia, No. 2x	14.50 @ 15.00
Standard Penna. and Virginia Forge	14.00 @ 14.50

## JUNE.

Standard Penna. (Lake Ore), No. 1x	\$15.75 @ \$16.25
Standard Penna. (Lake Ore), No. 2x	14.75 @ 15.25
Standard Virginia, No. 1x	15.25 @ 15.50
Standard Virginia, No. 2x	14.00 @ 14.50
Standard Penna. and Virginia Forge	13.50 @ 14.00
Ordinary Forge	12.75 @ 13.25

## JULY.

Standard Penna. (Lake Ore), No. 1x	\$15.00 @ \$15.50
Standard Penna. (Lake Ore), No. 2x	14.00 @ 14.25
Standard Virginia, No. 1x	14.50 @ 15.00
Standard Virginia, No. 2x	13.75 @ 14.25
Standard Penna. and Virginia Forge	13.00 @ 13.50
Ordinary Forge	12.50 @ 13.00

## AUGUST.

Standard Penna. (Lake Ore), No. 1x	\$15.00 @ \$15.50
Standard Penna. (Lake Ore), No. 2x	14.00 @ 14.50
Standard Virginia, No. 1x	14.25 @ 15.00
Standard Virginia, No. 2x	13.75 @ 14.25
Standard Penna. and Virginia Forge	13.00 @ 13.50
Ordinary Forge	12.50 @ 13.00

## SEPTEMBER.

Standard Penna. (Lake Ore), No. 1x	\$15.00 @ \$15.50
Standard Virginian (Lake Ore), No. 2x	14.00 @ 14.50
Standard Virginia, No. 1x	14.25 @ 14.50
Standard Virginia, No. 2x	13.75 @ 14.25
Standard Penna. and Virginia Forge	13.00 @ 13.50
Ordinary Forge	12.50 @ 13.00

## OCTOBER.

Standard Penna. (Lake Ore), No. 1x	\$15.00 @ \$15.50
Standard Penna. (Lake Ore), No. 2x	14.25 @ 14.50
Standard Virginia, No. 1x	14.75 @ 15.00
Standard Virginia, No. 2x	14.00 @ 14.50
Standard Penna. and Virginia Forge	13.25 @ 13.75
Ordinary Forge	12.75 @ 13.00

## NOVEMBER.

Standard Penna. (Lake Ore), No. 1x	\$15.25 @ \$15.75
Standard Penna. (Lake Ore), No. 2x	14.50 @ 14.75
Standard Virginia, No. 1x	14.75 @ 15.00
Standard Virginia, No. 2x	14.00 @ 14.50
Standard Penna. and Virginia Forge	13.25 @ 13.50
Ordinary Forge	12.75 @ 13.00

## DECEMBER.

Standard Penna. (Lake Ore), No. 1x	\$15.25 @ \$15.75
Standard Penna. (Lake Ore), No. 2x	14.50 @ 14.75
Standard Virginia, No. 1x	14.75 @ 15.00
Standard Virginia, No. 2x	14.00 @ 14.50
Standard Penna. and Virginia Forge	13.25 @ 13.50
Ordinary Forge	12.75 @ 13.00

**Steel Billets.**—Some rather wild fluctuations have been met with in this department. Prices opened steady in January at about \$27, which was maintained with slight variations until early in February, when a decided feeling of weakness began to manifest itself. This continued almost without a single reaction until July, at which time the complicated appearance of the labor question began to attract attention. Meanwhile prices had reached \$24.50 for deliveries to points equivalent to Philadelphia, and it is believed that \$24, or very close to it, was done in some instances. During August spot lots began to be at a premium and so continued until about the middle of November, after which date business gradually assumed its normal condition. During the fall months prices ranged from \$25.50 @ \$27, price being graded according to the necessity of the consumer and the condition of the seller's order book. There was no uniformity in prices, each transaction

being a law unto itself. To-day's prices are to some extent of the same character. Sellers ask \$24.25 @ \$24.50, but buyers are unresponsive, and, while it is hardly possible that there can be any appreciable decline from these figures, it is believed that business will not start up to any extent until makers are willing to quote about \$24. A few days will test the matter, but in the meanwhile it is understood that bids at that figure can be had for moderate sized lots for delivery during January and February; beyond that buyers are disposed to hold off. A few odd lots have been picked up at a trifle less than \$24, but for the time being that is probably a minimum quotation.

**Steel Rails.**—The year just closed has not been one of much interest, although in regard to the volume of business it has been one of considerable disappointment. The best authorities estimated a year ago that from 1,750,000 to 2,000,000 tons of heavy sections would be required during 1892, but the actual business has not been over 1,300,000 tons. When those in the trade fall so far astray in their estimates, it is obvious that there is a good deal of uncertainty in the situation, so that estimates for the current year are necessarily made with some reserve. It may be, however, that the deficiency during 1892 may have to be made up in 1893, so that on the whole the chances for an increased demand are fairly encouraging, and although "estimates," as we have shown, are sometimes misleading, there ought to be a demand for over 1,500,000 tons, and it may go very considerably over that. Prices during 1892 were uniformly \$30, f.o.b. cars at mills, and it is understood that \$29 is likely to be maintained as a permanent quotation during 1893.

**Finished Material.**—**Plates.**—The year has not been without its ups and downs, but on the whole it is not unlikely that well-equipped concerns will find the balance to be on the right side. The strikes in the West during the summer months helped the mills in eastern Pennsylvania as well as in other sections very materially, otherwise the result to some of them might have been much less favorable. Taking the year as a whole, the large mills in this vicinity were kept pretty well employed. Occasionally they were hampered by delays in specifications, but there was hardly any portion of the year in which there was an actual scarcity of orders on their books. Prices opened in January at about 1.90¢ @ 1.95¢, delivered, for Common Plates, gradually declining until the quotation was about 1.80¢ @ 1.85¢ during May and June, with a few special transactions said to be at about 1.75¢. During July prices began to move in the opposite direction, and so continued until September, when 2¢ had become an average quotation for Ordinary Plates. The point with consumers, however, was not so much a question of price as to get material to go on with, which state of affairs was continued with slight interruptions until the end of October. During November the supply became more liberal, and prices from that time began to show weakness, the decline being steadily downward until the close of the year, at which date orders could probably be placed at as low figures as have ever been recorded. It is understood that a large order for Tank Plates was recently taken at 1.75¢, delivered in Philadelphia; and it is intimated that several offers to deliver at less than 1.8¢ have since been declined, although for the average run of orders 1.85¢ @ 1.90¢ is quoted.

**Structural Material.**—Mills in this vicinity had plenty of business during 1892, and have a very fair start for 1893. Prices were irregular, commencing in January at 3.10¢ under the old combination, but working down before midsummer to

something less than 2¢ for Beams and Channels. The disintegration began in January, from which time to midsummer prices were constantly on the down grade. After July a reaction set in, and from that date to the present prices have varied from 2.1¢ to 2.25¢, although during the period of the strike as much as 2.5¢ had to be paid to secure prompt deliveries. The immediate position is not entirely satisfactory, prices being feverish and irregular, owing to close competition, but there is a great deal of business in prospect, so that on the whole matters are not quite as unfavorable as quotations may seem to indicate. If the mills can get plenty of business at present prices it is believed there is a fair margin for profit, as the improved methods of manufacture have decreased the cost of production surprisingly. The great anxiety is to get plenty of work, and with such immense plants as are now in existence, competition is naturally much closer than in former periods. The outlook is not discouraging, however, elevated railway work, architectural work, bridge work, shipbuilding and everything in that line promising very handsomely.

**Sheets.**—A large business has been done in Sheets, and if the mills had full justice shown them a much larger business would have been done. The manufacture of Tin Plates ought to have absorbed 100,000 tons of Thin Sheets, but imports have been so large that Sheet manufacturers have not had anything near the proportion of business they ought to have had. Nevertheless, mills have been almost continuously full of work, and if there is no tariff tinkering they are likely to do still better during the year upon which we have just entered. Prices have not varied to any extent, but are to-day very close to the lowest on record.

## Cleveland.

CLEVELAND, OHIO, January 3, 1893.

**Iron Ore.**—There is so much unsold Ore on the docks that there is very little talk regarding next season's sales, and absolutely nothing is being done in the way of actual negotiations. The market is quiet, and its condition can, perhaps, be best understood by quoting the remark, made to-day by a heavy buyer: "When we want a certain grade of Ore that is lying on the dock, we find who it belongs to, and indicate to him what it would be worth to us. If his price is not too far removed from our figures, we come together, make a few concessions all around and everybody affects to feel happy over the results." There have been no changes in quotations. Bessemer Hematites, if of extra good quantity, bring \$4 @ \$4.15 per ton, but to command these figures they must assay 63% in Iron and be low in phosphorus. Non-Bessemer Hematites at \$3 @ \$3.10 continue in fair demand. During the past week about 36,000 tons of Ore were sent forward to the furnaces, an increase of 4000 tons over the shipments for the same week one year ago. Some fair orders are likely to be placed within a few days. We quote:

No. 1 Specular and Magnetic Ores,	
Bessemers.....	\$4.85 @ \$5.00
No. 1 Specular and Magnetic Ores,	
Non-Bessemers.....	4.00 @ 4.15
Red Hematite, Bessemers.....	4.00 @ 4.15
Hematite Ores, Non-Bessemers.....	3.00 @ 3.15

**Pig Iron.**—The market is more active, but prices, if they have changed at all, are less firm. This is especially true of Foundry Irons. Dealers quote No. 3 Foundry at \$13; No. 2 at \$13.50 and No. 1 at \$14 per ton. Bessemers, too, are somewhat weaker. One of the heaviest firms in the city announce that they would be glad to sell Bessemer in almost any quantity for \$13.85, Cleveland delivery. We reduce quotations to \$13.65 @ \$13.75,

at Cleveland. A sale of Forge Iron is reported at \$12.50, Cleveland, and it is said that for a heavier order even these figures might be shaded. Several heavy buyers have discussed prices with local dealers during the week just closed, but have announced that they do not intend buying until the new year has fairly begun. No substantial advances in prices are looked for in January, although if all the buying is done that dealers are anticipating, quotations may go up a few points. A heavy purchaser says to-day that an offer of \$13.80 for any amount of Bessemer Iron from 100 to 10,000 tons would bring a dozen sellers to the front in quick order. The depression in Foundry Irons is expected to be of short duration.

**Old Iron Rails.**—Old Americans are quoted at \$20 per ton, Cleveland, but very little is being done in the way of sales. The supply is very heavy.

**Scrap.**—The market is in poor condition and prices are low. We quote No. 1 Railroad Wrought at \$15; Cast Iron Borings at \$7.50; Wrought Turnings at \$10, and Cast Scrap at \$11 per ton, Cleveland.

**Old Wheels.**—Business is only fair. We hear of a small sale at \$14 per ton, Cleveland delivery.

**Muck Bar.**—Dealers give \$24.50 @ \$24.75 as fair quotations, with only a small amount of business being done.

**Barb Wire.**—Little is being done in the way of sales, but manufacturers anticipate a very good season. We quote Galvanized at \$2.40 and Painted at \$2 in carload lots.

**Common Bar.**—A fair business is being done at 1.60¢ @ 1.65¢, Cleveland. The stopping of some of the mills for repairs is helping the market slightly.

**Nails.**—The market is slow and prices show no improvement, although a better demand is looked for early in the year.

**Freight.**—The new year begins with the following freight tariffs in force between the leading producing and consuming points: Pig Iron : Valley points to Cleveland, 60¢ per ton; to Pittsburgh, 60¢. Muck Bar, Blooms, Billets, Scrap, Iron and Steel Rails, Old Wheels, &c.: Valley points to Cleveland, 70¢ per ton; to Pittsburgh, 75¢ per ton; to Boston, \$3.10 per ton; to New York, \$2.70 per ton; to Philadelphia, \$2.10 per ton; to Newark, \$2.50 per ton.

## Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, January 4, 1893.

(By Telegraph.)

The old year closed with no essential change in the tone of the Pig Iron market and the New Year is yet too young for any important developments. There is, however, a more ample supply of cars and deliveries on old contracts are more promptly made and current purchases are delivered without difficulty. The volume of current business continues light, but there is more inquiry for round lots for forward delivery and some sales have been effected of Foundry Iron for the first six months in this year at the same prices as are current for spot delivery, but the largest quantity in any one order was only 125 tons, yet that has tested the sentiment of both buyers and sellers. For Gray Forge Iron bids of \$8.75, f.o.b. Birmingham, have been rather indignantly refused, with the intimation that no less than \$9 would buy for either spot or forward delivery. The indications are that the melting of Iron is on a liberal scale in nearly every line of consumption, but there is nevertheless a desire to ascertain the condition of stocks and the volume of production at the beginning of the new year. There is apparently a good prospect for liberal consumption the first few months of this year,

but buyers do not fear any scarcity of pig iron. Quotations are as follows:

<i>Foundry.</i>		
Southern Coke, No. 1.....	\$13.75 @	\$14.00
Southern Coke, No. 2.....	12.50 @	12.75
Southern Coke, No. 3.....	12.00 @	12.25
Ohio Soft Stone Coal, No. 1.....	16.00 @	16.50
Ohio Soft Stone Coal, No. 2.....	15.00 @	15.50
Mahoning and Shenango Valley.....	15.75 @	16.75
Hanging Rock Charcoal, No. 1.....	19.15 @	19.50
Hanging Rock Charcoal, No. 2.....	18.00 @	19.00
Tennessee and Alabama Charcoal, No. 1.....	16.50 @	17.00
Tennessee and Alabama Charcoal, No. 2.....	15.50 @	16.00
Gray Forge.....	11.50 @	11.75
Mottled Neutral Coke.....	11.25 @	11.50
<i>Car Wheel and Malleable Irons.</i>		
Standard Southern Car Wheel.....	18.75 @	19.00
Lake Superior Car Wheel and Ma- leable.....	17.75 @	18.00

Hyatt, Mathews & Co. have been appointed exclusive sales agents for the Sloss Pig Iron, manufactured by the Sloss Iron & Steel Company of Birmingham, Ala., in the State of Ohio, all territory south of the Pittsburgh, Fort Wayne & Chicago Railroad in West Virginia, all the towns on the Ohio River, and in Kentucky, all the towns from Ashland to Covington.

## Louisville.

LOUISVILLE, KY., January 3, 1893.

The same conditions exist that prevailed last week, buyers preferring not to contract for long periods ahead until after the beginning of the new year. Business continues fair, and Iron on old contracts is being ordered forward rapidly. Consumers still feel that the market is in their favor, and believe that a slight shading in prices can be obtained if they will but wait. Furnaces have shown a disposition to meet this to a greater extent than for some time, and No. 2 Foundry is being offered on a basis of \$9.50, Birmingham, by the leading companies. Old Wheels can be bought very low, some being offered at \$14.

We quote for cash, f.o.b. cars Louisville:

Southern Coke, No. 1 Foundry.....	\$13.25 @	\$18.50
Southern Coke, No. 2 Foundry.....	12.00 @	12.25
Southern Coke, No. 3 Foundry.....	11.50 @	11.75
Southern Coke, Gray Forge.....	11.25 @	11.50
Southern Charcoal, No. 1 Foundry	15.00 @	16.00
Southern Car Wheel.....	17.50 @	17.75

## St. Louis.

(By Telegraph.)

**Pig Lead.**—There has been nothing in the way of business during the past week. Consumers are not carrying very heavy stocks and any concerted movement in the direction of buying would probably result in higher prices. Nominally, the market is 8.55¢, at which price orders would be gladly accepted.

**Spelter.**—This metal is practically unchanged, so far as the demand is concerned. Price, however, is now 4.05¢, with no business doing. The outlook for Spelter is not very encouraging, as consumers appear to be well supplied and producers are compelled to store their excess product, thus adding to the already large surplus.

## Metal Market.

**Copper.**—New developments in the market for this metal have failed to materialize. Local representatives of Lake Superior producers and dealers prominently identified with the market speak hopefully of the outlook, calculating upon a heavy demand for Copper for electrical purposes during the coming six months, in addition to fully the average consumption in other lines. Advices from Europe are to the effect that the prospects are favorable there also, and that in the event of

production being kept down to the average of the past five months values are more likely to hold firm or advance than to recede. The plain fact remains, however, that business on both home and export account is of commonplace character at present and that demand from all quarters is tame. Prices have undergone no change. The common quotation for Lake Ingots is 12½¢, but 12½¢ @ 12¾¢ will yet secure moderate quantities in some quarters. Casting Copper may be picked up at 11½¢ in small lots, but sellers at less than 11½¢ are few and far between.

**Pig Tin.**—The position of the market is practically the same as it was a week ago. Authorities differ somewhat as to the amount of stock on hand in this country, and statistics of shipments from the Straits last month are also conflicting. Thus, the spot stock is estimated by some at 4500 tons, while others make 3500 tons the maximum, and Straits shipments during December are variously estimated at from 2980 tons to 3250 tons. Along with this variable date there has been more or less manipulation of prices by prominent speculators, making, in all, a combination of circumstances that naturally tends to prompt more than ordinary caution on the part of jobbers and consumers. During the period under review sales have been made here at 19½¢ for January delivery, but subsequent offers at as low as 19.65¢ failed to stimulate buying for either speculative or trade account. Cable advices to the Metal Exchange reported shipments from the Straits during December as having been 2980 tons, including 1650 tons to Great Britain, 530 tons to the United States and 800 tons to the Continent. Australian shipments were 450 tons, all but 50 tons of which were for Great Britain. London shipped 600 tons and Holland 90 tons to the United States. The consumption is estimated at 3250 tons, including 1500 tons credited to the United States, and 1060 tons to London. The visible supply is placed at 14,014 tons, against 15,175 tons a month ago, including a total of 8782 on spot in London, Holland and America, and 5232 tons afloat. On the face of the returns there would thus appear to be nearly five months' supply in sight. On Wednesday there was quite a liberal speculative movement, involving about 200 tons at 19½¢ @ 19.80¢ for January, 19.85¢ for February and 20¢ for March delivery.

**Pig Lead.**—Transactions have been commonplace and moderate all told. The demand has lacked spirit also and evidence is wanting of any decided change on the part of sellers. As for speculative interest, there is none to speak of. Spot stocks are moderate, but leading producers are said to have a very fair supply on hand and under contract and it is an open secret that current output is sufficient to supply a liberal demand. The bulk of business effected during the week has been at 8.55¢ for prompt and near future delivery.

**Spelter.**—The market remains quiet and rather soft. Jobbers have made quite full public bids in a few instances where maneuvers of that kind might safely be engaged in for a purpose, but purchases by Eastern consumers are still of a perfunctory character, and the supply on offer continues liberal. Ordinary Western brands were sold at 4.35¢, which price seems to be about the best that can be obtained for round lots at the moment.

**Antimony.**—There has been only a routine business and the market continues soft. Current quotations are 10½¢ for Hallett's, 11¢ for LX, 11¢ for Crown and 11½¢ @ 11½¢ for Cookson's in round lots.

**Tin Plate.**—Purchases of Bessemer Coke Finish Plates for spring season de-

livery have continued on a fairly liberal scale, and the business effected latterly has had sufficient force to stiffen prices slightly. Spot goods have met with slow sale, however, and for pretty much all varieties of Plates that are in stock prices lean somewhat in buyers' favor. No changes in prices are quoted, however, except for Bessemer Cokes and large size Wasters. We quote spot prices as follows: Coke Tins—Penlan grade, 1C, 14 x 20, scarce; J. B. grade, do., scarce; Bessemer full weight, \$5.85; light weights, \$5.10 for 100 lb., \$4.95 for 95-lb., \$4.85 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60 @ \$5.65; Siemens Steel, IC basis, \$5.75; IX basis, \$6.80 @ \$6.85. IC Charcoals—Melyn grade, 1 X assortment, \$6.40; Crosses, \$8; Allaway grade, any assortment, \$5.70; Crosses, \$7; Grange grade, any assortment, \$5.80; Crosses, \$7.15. Charcoal Ternes—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.85; M. F., 14 x 20, \$7.75; do., 20 x 28, \$15.50; Dean, 14 x 20, \$5.40; do., 20 x 28, scarce; D. R. D. grade, 14 x 20, \$5.30; do., 20 x 28, \$10.50; Alyn, 14 x 20, \$5.35; do., 20 x 28, \$10.60; Dyffryn, 14 x 20, \$5.50; do., 20 x 28, scarce. Wasters—S. T. P. grade, 14 x 20, \$5.10; do., 20 x 28, \$9.75; Abercane grade, 14 x 20, \$5; do., 20 x 28, \$9.75.

Phelps, Dodge & Co. announce that they have admitted Arthur Curtiss James, son of D. Willis James, as a partner in the firms of Phelps, James & Co. of London and Phelps, Dodge & Co. of New York.

## Financial.

It is generally conceded that in most lines of business the year just closed has been one of exceptional prosperity, despite the fact that it was a "Presidential year" and such a result might have been anticipated as naturally following a year of unprecedented agricultural abundance. The volume of trade was of unusual proportions, but as a rule prices were low and the margin of profits unsatisfactory. Cotton manufacturing seems to have been a notable exception. The present condition of trade throughout is pronounced sound, but the outlook for 1893 must be regarded as uncertain, chiefly on account of financial problems, of which the silver question and a possible Treasury deficit are uppermost. Europe, too, is under a cloud, both financially and politically, so that a conservative policy on the part of business men with reference to the future is the suggestion of wisdom. Owing to the low prices of cotton and grain and the reduced value of exports, together with the return of American securities in exchange for gold—the latter at a period as unseasonable as it is inopportune—in respect of Treasury operations, the outlook for foreign trade is less satisfactory than could be wished. On the other hand, the traffic stimulated by the Columbian Fair cannot but impart a wholesome influence, and the unprecedented accumulation of grain at Western points for forward shipment in the spring gives promise of unusual activity on the opening of navigation and remunerative freight. Even for the month just closed railroad earnings were larger than for the corresponding month last year. Payments through clearing houses outside of New York in December were the largest ever made in any month, exceeding those of 1891 by 15%, and the year's transactions exceed those of any previous year by nearly 8%. At New York the increase in December was 10%, but for the year over 8%.

The merchandise markets show but little change, excepting wheat, which rose last week about 2¢, though Western

receipts for three weeks have been 16,300,000 bushels, or 3,000,000 larger than for the same time last year; the visible supply is 35,000,000 bushels larger than a year ago, and the exports in four weeks have been but 14,846,000 bushels, against upward of 18,000,000 bushels last year. Weakness in cotton is due to an excess in the visible supply over any existing demand. The first bale of machine picked cotton sold at the fancy price of 77¢ per pound. In dry goods jobbers report that collections continue good and everything seems to indicate an early spring trade.

Mcney was in fair demand, especially at the close of the week, when the demands for the annual dividend disbursements and settlements caused a temporary sharp advance in rates. There has been a cessation in gold export shipments, save \$500,000 shipped on Saturday. Silver bullion advanced 1d. per ounce in London and ½d. in New York.

The tendency in the stock market was toward firmness and better prices, especially for dividend-paying securities. At the close an advance in Manhattan was caused by the announcement to the Rapid Transit Commission that the Manhattan was ready to make any agreement for the improvement of rapid transit service that might be suggested by the commission. The transactions in stocks in the last year amounted to 85,810,406 shares, against 68,162,049 in the preceding year, and 69,846,897 in 1890. The New York Stock Exchange added to its list for dealings during the last year \$324,919,261 of bonds and \$228,892,038 stocks, making a total of \$553,811,299, almost the same as the previous year.

Bonds generally have advanced. United States bonds were quoted as follows:

U. S. 4½%, 1891, extended.....	100
U. S. 4%, 1897, registered.....	113
U. S. 4%, 1897, coupon.....	114
U. S. currency ds. ....	107

The number of failures occurring in the United States in the year 1892, as reported by R. G. Dun & Co., is 10,344, being a less number than in any year since 1886, and showing a difference in favor of the past year as compared with 1891 of 2029. The indebtedness of the failures for the past year shows also a marked decrease, being \$114,000,000 in 1892, as against \$189,000,000 in 1891 and a nearly similar amount in 1890. The largely augmented number of traders and the enormous increase of transactions in the year render these figures very significant. Only one in every 113 traders in the United States succumbed in 1892, against one in every 98 in 1891, and one in every 102 in 1890. The average liability of the failures in the last year was \$11,000, being the lowest average reported since 1878.

The *Railroad Gazette* reports that the record of railroad construction in 1892 shows that there has been a little over 4000 miles of new track laid in the United States in that period, or about the same amount of new mileage as was built in 1891. The Pacific extension of the Great Northern is to be credited with 588 miles of this total and the track laid on that line in Washington, 351 miles, brings that State to the head of the list of States laying new track. Five States have built 200 miles.

## Coal Market.

Another interesting development in the Anthracite Coal trade is chronicled this week which is capable of various constructions, viz.: the separation of the Lehigh & Wilkesbarre Coal interests from the Reading management. President Maxwell of the New Jersey Central Railroad, being likewise president of the Lehigh & Wilkesbarre, is supposed to be desirous of restoring the *statu quo* so far as possible to the

conditions existing prior to the Reading combine, in order to conform to a recent ruling of the courts. Naturally, it is reasoned, Mr. Maxwell takes with the Coal company, from prudential considerations. Accordingly, the latter has issued its circular recognizing the fact, and Percy B. Heilner is sales agent. Combine prices are nowise affected, and the market remains as a week ago. Pea alongside is \$2.85, Buckwheat \$2.25. Some dealers in the trade assume that the separation of the Lehigh & Wilkesbarre from the Reading Company following the new finance arrangement indicates weakening which precedes final dissolution somewhere in the future. The relative importance of the financial and legal complications respectively is variously understood.

Bituminous Coal is in good demand, up to the supply, and the market is stiff. Cumberland is quoted \$3.25 @ \$3.50, alongside; Clearfield, \$3 @ \$3.25

## New York.

Office of *The Iron Age*, 96-102 Reade street, NEW YORK, January 4, 1893.

**Pig Iron.**—Reports are current that some of the Southern furnaces are cutting prices, the leaders in the movement being apparently new plants, while the large companies still adhere to quotations and do little business. The Thomas Iron Company are pursuing the same policy as to sales which was inaugurated and continued for so many years by the former management. We quote Northern brands at \$15 @ \$15.50 for No. 1; \$14 @ \$14.50 for No. 2; \$18 @ \$18.50 for Gray Forge, tidewater. Southern Iron, same delivery, \$14.75 @ \$15 for No. 1; \$18.75 @ \$14 for No. 2 and No. 1 Soft; \$18.25 @ \$18.50 for No. 2 Soft; \$12.75 @ \$18 for Gray Forge.

**Ferromanganese.**—Business in foreign Ferro has again fallen off, and the lower prices in the West make sales beyond the Allegheny Mountains impossible at present quotations. We quote nominally \$60 @ \$60.50.

**Billets and Rods.**—There is no business of consequence going. We quote Steel Billets, tidewater, \$24.25 @ \$24.75; foreign, \$29.25 @ \$30; Wire Rods, \$32.50 @ \$33.50; foreign Wire Rods, \$40 @ \$40.50, and Swedish Rods, \$54.50 @ \$56.

**Steel Rails.**—Pending negotiations alluded to in our last issue have not yet been closed, and the market is very quiet. Up to the 1st of December the deliveries of standard sections by all the mills, with the exception of the Colorado, were a few thousand tons above 1,200,000 tons, so that taken in all the deliveries of standard sections during 1892 were about 1,300,000 tons. We continue to quote \$29 at Eastern mill.

**Structural Iron and Steel.**—While there is evidence that there will be a good deal of architectural work in the local market this season, no new contracts of magnitude have been closed as yet. We quote Beams at 2.25¢ @ 2.75¢ for small lots and 2¢ @ 2.25¢ for round lots, according to sizes; Angles, 1.85¢ @ 2¢; Sheared Plates, 1.85¢ @ 2.10¢; Tees, 2.10¢ @ 2.30¢; Channels, 2.10¢ @ 2.20¢, on dock. Car Truck Channels, 2¢ @ 2.10¢. Steel Plates are 1.85¢ @ 2¢ for Tank; 2.10¢ @ 2.25¢ for Shell; 2.40¢ @ 2.65¢ for Flange; 2.5¢ @ 2.75¢ for Marine, and 2.60¢ @ 2.80¢ for Fire Box, on dock. Refined Bars are 1.65¢ @ 1.9¢, on dock; Common, 1.55¢ @ 1.80¢. Scrap Axles are quotable at 1.90¢ @ 2.10¢, delivered. Steel Axles, 1.90¢ @ 2.1¢, and Links and Pins, 2¢ @ 2.20¢; Steel Hoops, 1.90¢ @ 2¢, delivered.

**Track Material.**—We quote Spikes, 1.90¢ @ 2¢; Fish Plates, 1.60¢ @ 1.65¢; Track Bolts, square nuts, 2.40¢ @ 2.60¢, and hexagon nuts, 2.70¢ @ 2.80¢, delivered.

## British Iron and Metal Markets.

[Special Cable Dispatch to *The Iron Age*.]

LONDON, WEDNESDAY, January 4, 1893.

Business in Pig Iron warrants has been very moderate and of strictly holiday character, with little if any outside interest manifested. Prices have varied in a slight degree only, the bulk of business having been at about 41/7½ for Scotch, 36/7½ @ 36/9 for Cleveland and 45/9 @ 45/10½ for Hematite. Operators have manifested a disposition to hold back until after the quarterly meetings. Glasgow market was closed on Monday and Tuesday and works at furnaces suspended for the week. There are now 72 Scotch furnaces in blast. Returns of production of Hematite Iron in the Barrow district show a decrease last year of 264,800 tons as compared with 1891, and a reduction of 102,900 tons in stocks. The decrease is due chiefly to the late Durham strike. Stocks in public stores include 340,000 tons Scotch and 26,000 tons Cleveland. The statistical position favors producers at present, but dullness in finished Iron and Steel is a drawback. The dullness in this line has led to a reduction of 10% per ton in the price of Staffordshire Marked Bars.

No new feature in the Metal market. Business has been slow throughout and prices have undergone little change. Stocks of Copper increased 847 tons last month and the visible supply is larger by 2247 tons.

The Tin-Plate market has been very quiet and is likely to remain so until after the quarterly meetings. Prices no lower, but business is secured only through the attraction of concessions. Stocks at shipping ports amount to 177,000 boxes, against 122,000 boxes at the corresponding period last year.

**Scotch Pig Iron.**—Makers' Iron selling slowly and at irregular prices; several brands are lower.

No. 1 Coltness,	f.o.b. Glasgow.....	55/
No. 1 Summerlee,	" "	50/6
No. 1 Gartaherrie,	" "	51/6
No. 1 Langloan,	" "	53/
No. 1 Carnbroe,	" "	44/
No. 1 Shotts	at Leith.....	52/6
No. 1 Glengarnock,	Ardrossan.....	49/6
No. 1 Dalmellington,	" "	49/
No. 1 Eglington,	" "	46/3
Steamer freights, Glasgow to New York, 1/;		
Liverpool to New York, 7/6.		

**Cleveland Pig.**—Business slow and prices barely steady at 37/, f.o.b. shipping port, for No. 8 Middlesborough.

**Bessemer Pig.**—There is little doing and prices are still nominal to a great extent. Makers quote 47/8 for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

**Ferromanganese.**—Demand moderate and prices without decided change. English 80% quoted at £11. 11/3, f.o.b. shipping port.

**Steel Rails.**—No improvement in the demand, but makers hold firmly for former prices. Heavy sections quoted at £4, f.o.b. shipping port.

**Steel Slabs.**—Market remains quiet and unchanged. Bessemer quoted at £4, f.o.b. at shipping point.

**Steel Billets.**—The market remains quiet and prices are without change. Bessemer,  $2\frac{1}{2} \times 2\frac{1}{2}$  inches, quoted at £4, f.o.b. shipping point.

**Steel Blooms.**—Very little business passing and the market easy. Makers quote £4 for  $7 \times 7$ , f.o.b. shipping point.

**Old Iron Rails.**—No change in prices and little doing. Tees quoted at £2. 10/- @ £2. 12/6 and Double Heads at £2. 15/-, f.o.b.

**Scrap Iron.**—The market fairly steady but quiet. Heavy Wrought Iron quoted at £2. 2/6 @ £2. 5/-, f.o.b.

**Crop Ends.**—Dull market for these, with former prices asked. Bessemer quoted at £2. 7/6 @ £2. 10/-, f.o.b.

**Manufactured Iron.**—Apart from a reduction on Marked Bars there has been no change, but the general market is rather weak. We quote, f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff. Ordinary Marked Bars	8 0 0	8 0 0
" Common "	6 7 6	6 10 0
Staff. Bl'k Sheet, singles...	6 7 0	7 10 0
Welsh Bars (f.o.b. Wales)...	5 7 6	5 10 0

**Tin Plate.**—Prices without change, and the market steady at the close. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade .....	13/6 @ 13/9
IC Bessemer Steel, Coke finish .....	12/0 @ 12/4
IC Siemens .....	12/3 @ 12/6
IC Coke, B. V. grade 14 x 20.....	12/0 2/0
Charcoal Terne, Dean grade.....	11/9 2/0 12/

**Pig Tin.**—Market closed quiet and barely steady. Straits quoted at £91. 10/- @ £91. 12/6 for spot and £91. 5/- for three months' futures.

**Copper.**—Fair demand at the close and prices steady. Merchant Bars quoted at £46. 10/- spot and £47 three months' futures. Best selected, £51. 10/-.

**Lead.**—Market slow and prices barely steady at £9. 17/6 for Soft Spanish.

**Spelter.**—The market quiet and prices barely steady at £18. 7/6 for ordinary Silesian.

## The German Iron Trade.

DUESSELDORF, December 15, 1892.

The depression continues, and further dismissals of workmen have taken place. Still there are a few who maintain that the lowest point has been reached, and therefore some of the works will not accept large orders at present low prices. The Bochum Company have received a contract for a large lot of Rails for South America and there is a rumor that about 25,000 Steel Blooms have been sold to North America. The prices, however, were below cost, and the order was taken merely to keep the men busy.

Perhaps it may serve as an indication of the coming improvement that some of the works here cover their supplies of raw material for long periods. Thus a Steel works has just contracted for 100,000 tons of Basic Pig Iron at the price of 44 marks.

At Carlsruhe 1200 tons of Steel Sleepers were taken on December 12 by the Phoenix Company at 118 marks, f.o.b. Carlsruhe. So far as Steel Cross Sleepers are concerned, it would seem as though the State railroads are inclined to supplant the wooden ties in larger quantities than heretofore by Steel Sleepers. It is a notorious fact that about 95% of the wooden ties used on German railroads are imported, and it is the aim to supplant these imported ties by German Steel Sleepers. Should this prove to be generally the case

the German Iron industry would obtain orders aggregating many hundred thousands of tons annually.

In the Wire trade large export orders are announced, but unfortunately no price is named.

The business in Beams is very much depressed because the building season has ended and all work is now for stock only. The same is true of Cast-Iron Pipe, which is sold at 120 marks  $\frac{1}{2}$  ton at the foundry.

### Production and Exports.

In the month of October the production of Pig Iron was 416,973 tons, as compared with 392,166 tons in October, 1891. Grouped according to the different grades of Pig Iron, the production was as follows:

	1892.	1891.
Forge and Spiegel.....	156,638	187,571
Bessemer Pig.....	26,117	35,790
Basic Pig.....	179,448	160,766
Foundry.....	58,870	58,039

Totals..... 416,973 392,166

From January 1 to October, 1892, the production was 4,004,714 tons, as compared with 3,687,822 tons in the same period during 1891, an increase, therefore, of 316,892 tons. This increase in the production is due almost exclusively to the Luxemburg-Lorraine district, while the output has remained stationary in the Ruhr district because the freights on ore to the furnace are too high and the price of coke is also kept too high.

The exports of Pig Iron were 6876 tons in October, 1892, as compared with 10,549 tons in October, 1891. The exports to the United States were only 965 tons, or far less than half the quantity sent out in October, 1891.

## San Francisco News.

SAN FRANCISCO, December 31, 1892.

We near the close of the year with the death of one of our leading citizens and one of the foremost men in the hardware trade of San Francisco, L. L. Baker of the firm of Baker & Hamilton. Mr. Baker died on the 21st, succumbing to an apoplectic attack of unusual violence when he was enjoying himself in the home circle. At the same time his partner, Mr. Hamilton, was suffering from the effects of an attack of paralysis. This threw an unusual amount of responsibility on the hands of Mr. Baker on account of the great extent of business, which is equal to \$1,500,000 a year. It is not to be believed, however, that this affected him in any appreciable degree. He was born in Portland, Maine, in 1827, but not at all with the proverbial silver spoon in his mouth. In fact it was far otherwise, and for many years he had to endure his share of the slings and arrows of outrageous fortune. He came to the coast in 1849, and paid part of his passage by hard work. He went to the mines and while there formed the acquaintance of Mr. Hamilton, who was a kindred spirit and with whom he ever afterward remained associated. Early in the sixties these two friends started a small hardware business in Sacramento. They prospered and in a few years had branches in Stockton and San Francisco; the latter was established in 1867, when they rapidly pushed to the front of the business, where they have ever since remained. They have, besides, an agricultural works at Benicia. The establishment in San Francisco has long since become the leading one. Mr. Baker was engaged in many enterprises. He has been president of the Chamber of Commerce, a director and a prominent member of the Traffic Association, and took leading part in commercial matters generally. He was earnest, vigorous and enthusiastic in the advocacy of any cause by him undertaken. He has been especially active

in the affairs of the Traffic Association, and was a strong and enthusiastic supporter of the line of clipper ships which has made competition with the railroad alone possible—in fact it was only the other day that he delivered the principal address at the dinner held to celebrate the successful trip of the "Chas. E. Moody," the pioneer vessel of the opposition line of clipper ships. Mr. Carolan, of another large hardware firm and a relative, will manage the business till Mr. Hamilton convalesces.

Imports by sea for the past two weeks have been light in character. The market, however, is sufficiently well stocked at present. The late imports of tin plate have all gone into second hands and the market is firm at an advance, coke being now quotable at \$6. to \$6.15, spot, the highest in quite a while. This shows that the stock is well concentrated. Pig tin, on the contrary, has been reduced in price, being now quotable at 22½ cents. For Australian this is lower than the article has been for a long time.

General business in hardware and metals has been rather quiet. This, of course, is the time of the year for such a state of things, and therefore no one grumbles. But there is grumbling not loud, but deep, as to the character of the year as a whole. This is as usual coupled with pleasant anticipations as to the outlook of the incoming one. We have been treated to rain and storm for about one-half the week. The storm has been even more violent in character than that of a little while ago. Of course, this serves to take the life out of what little trade may be left at this time of year.

The "Monterey" has developed a speed of 12 knots without running her engines at full speed. Like all vessels of her class, however, she was very low in the water. This reminds me that 150 men have been laid off temporarily from the Union Iron Works, as the vessels on hand approach completion. It is felt that one of the cruisers, despite the discrepancy in price, should be awarded to the Union Iron Works, as the difference in the bid would be narrowed down pretty closely to what is allowed for sending the vessel around to the coast. Here we all earnestly hope that the coast will have the building of one of the cruisers.

Imports by rail for the past two weeks have been moderate—34 cars. They comprise 2 cars of agricultural implements, 8 of pipe, 4 of machinery, 7 of iron, 2 of steel, 6 of hardware, 1 of ranges, 4 of stoves, 1 of wire, 1 of castings, 1 of washers, 1 of wagons, and 1 of wire netting; 871 plates of spelter, 817 boxes of nails, 5960 pounds of lead, 50,870 pounds of zinc and 3110 pounds of copper.

Advices from Parkersburg, W. Va., under date of January 1, state that the entire amount of coal and coke shipped from the Fairmont region in 1892 was 1,031,217 tons, an increase of 25 per cent. over 1891, notwithstanding the prolonged strike. One third of the total output was produced by the Monongahela Coal & Coke Company, and, had there been no strike, according to the figures of the heaviest operators, the aggregate output would have doubled that of the preceding year.

The plant of the Robinson-Rea Mfg. Company at Pittsburgh, manufacturers of rolling mill machinery, was entirely destroyed by fire on Saturday, the 30th ult. The loss is estimated at about \$50,000, fully covered by insurance. This firm have recently been devoting considerable attention to the manufacture of machinery for tin-plate plants, and the fire has destroyed a number of patterns which were quite valuable. The plant will be rebuilt on a larger scale as soon as possible on the old site.

# HARDWARE.

## Condition of Trade.

**N**O TWITHSTANDING the fact that trade is characterized by the inactivity which is expected at the opening of the year and before the accounts of the past year have been balanced, there is evidence of an excellent feeling in regard to the prospects for business during the season. There have been thus far few changes in price and few announcements of new lists, but some of the manufacturers are sending out new catalogues and there is evidently a good deal of enterprise being shown in putting new goods on the market, improving plants, &c. The reviews of the year's business, which are given elsewhere, and also the reports from our special correspondents in the different centers, will be read with interest and will furnish excellent data for an intelligent estimate of the principal features of the business situation.

### Chicago.

(By Telegraph.)

Shelf Hardware jobbers report trade quiet, as their salesmen have not yet started out. Prospects are bright for the coming year, as the Northwest is in excellent shape. Farmers have enjoyed two very prosperous years, with good results to all interests directly connected with them. Heavy Hardware jobbers report their trade starting off well this year, manufacturing consumers taking liberal supplies of all sorts of stock handled in this branch of trade.

### St. Louis.

(By Telegraph.)

Trade has not quite recovered from the holiday dullness, and as it will be a week or ten days before traveling men will be on the road again, business is not likely to be very heavy. The local cold snap has enabled jobbers to clean up their stock of Skates, some of which they have been carrying for several years. Barb Wire and Wire Nails are dull and prices are somewhat weaker. Jobbers are all busy preparing for a big trade during the present year and say the outlook is decidedly encouraging. The Southern trade is not as good as might be expected, but shows a decided improvement over the corresponding period of one year since. Texas trade has been large on account of cut in freight rates.

### Boston.

**BIGELOW & DOWSE.**—The Hardware business for 1892 has been prosperous, and although values have been very much reduced the volume has been increased, so that the trade generally agree that sales will show a handsome increase over those offer.

of 1891. The increase is a necessity, as the old-time profits do not realize in the keen competition of to-day. To take the place of declining profits on general Hardware many of the wholesale as well as the retail dealers are making stronger efforts for the sale of Cutlery and Bicycles and other specialties. Many retail dealers who know the possible profits from handling these additional lines are adding them to their regular stock, and while the sale of Bicycles, for instance, has been almost wholly controlled by agents making a special business of these goods, to-day the Hardware dealer is a strong competitor for a share of the profits. With general prosperity in nearly every industry throughout New England it seems fair to prophesy a successful year for the Hardware dealers in '93.

### Louisville.

**W. B. BELKNAP & Co.**—The year closes with such trade conditions as lead to the hope for a prosperous season ahead. The indications are that trade is on a healthy basis. Values are extremely low; there is no inflation anywhere—at least none apparent.

The legitimate consumption of the country has kept on growing at a great pace, while production, except in a few lines, has not been much increased, so that what is made is readily taken up and absorbed.

There has been no speculative buying, except a little flurry in Steel Billets and Wire Nails about 60 days ago. That speedily subsided and nobody was badly hurt.

The general report made by Dun & Co. is inspiring. The large reduction in the number of failures and small average amount of each compare most favorably with former years. Locally, the returns from our Clearing House indicate the largest business we have ever had, save one year, and the fact that there have been few new speculative enterprises recently undertaken would seem to indicate that the regular business was even larger than in that one exceptional year.

The railroads centering here are full of business, while retail shopkeepers say they have never had such liberal buying done over their counters.

There is prospect of a large acreage being planted next year, as the returns for tobacco and hogs and general farm produce this year would encourage and justify this.

We have selected the most golden-tinted and rose-hued calendar which has yet arrived and hung it on the walls of our commercial temple as a votive offering to 1893, a sort of "payment in advance," which is generally understood to fetch the most favorable terms the recipient has to offer.

### Omaha.

**LEE - CLARKE - ANDRESEN HARDWARE COMPANY.**—The season has now arrived when a let-up in the movement of goods is anticipated; a realization not unwelcome just now, as all the jobbing trade have been very busy inventorying their stocks during the past week preparatory to closing their books and balancing the past year's traffic.

Taking the year 1892 throughout, it is conceded that for volume of business transactions it has been unequaled, and as far as the profitable part of it is concerned, it might be termed a "Honey Montgomery" in comparison with preceding years. The general feeling throughout the territory west of this metropolis is one of uniform confidence, and the conviction prevails that all these conditions point to a heavy volume of business, at least until the new crop begins to attract attention.

In some quarters perhaps a tendency toward a conservative business policy may become apparent later on, owing to more or less apprehension as to future legislation.

According to Secretary Rusk's recent reports, Nebraska stands at the head of the corn-growing States, and there is no reason whatever to doubt but that she will show an abnormal growth in the next succeeding years.

If the railway corporations could be induced to lower their present high rates for the transportation eastward of the products of this State, it would add an immense stimulus to the almost boundless field for production, and at the same time quickly enrich their coffers by doubling their volume of business.

It is to be regretted that foresight in matters of this kind should be so continuously neglected or postponed, when it is apparent that in the natural course of events changes of this kind will have to be inaugurated sooner or later simply by force of circumstances.

### New Orleans.

**A. BALDWIN & Co.**—Business is much more quiet in this section of the country, owing, no doubt, to the people paying more attention to the holidays than they are to business at this season. Trade has been fair in seasonable goods and the merchants as a class seem to be waiting until the new year opens before making any additions to their stocks. The prospects for the coming three months are very bright and we anticipate that the volume of business will show such an increase as will somewhat recompense us for the dullness of the present time.

### St. Paul.

**FARWELL, OZMUN, KIRK & Co.**—In the closing up of the year's business in the Northwest, there is but little to add to the brief reports which we have given you

regularly during the year. Jobbers have been giving their main attention to collections and closing of accounts and to the taking of inventories, the general results of which will not be widely different from the expectations of conservative business men. Collections are probably not quite so favorable as expected, owing principally to the remarkably low price of wheat. These prices are below the cost of production, if anything like a fair compensation for all the labor and risk involved is taken into account, and it is to be hoped that better prices will prevail hereafter. The farmers are, however, gradually diversifying their crops and are also raising much more live stock, and are engaging in the keeping of dairies. The low price of wheat does not now affect them to the same extent that it would have done a few years ago.

Upon the whole, the year's trade has been satisfactory to the jobbers generally, and, while they will be obliged to carry over customers to some larger extent than hoped for, the burden will generally not be excessive, and, with conservative management, jobbers will be able to begin the new year's business under favorable conditions. We cannot expect a heavy trade, but the retail stocks of Hardware throughout the country are not large and the demand for goods for current wants will make a fair trade.

Taking it altogether, while the prospects might easily be somewhat better, they might be a great deal worse, and we bid farewell to the old year, feeling that it has, on the whole, dealt kindly with us.

#### Cleveland.

**THE W. BINGHAM COMPANY.**—Eighteen ninety-two closes with a good record, so far as Hardware jobbers are concerned. There probably has never been as many goods sold in this locality in any one year, and of all kinds—Shelf and Builders' Hardware, Cutlery, House Furnishing Goods, Agricultural Goods—in fact, everything in the line has shown an increased business, but notwithstanding this the prices, with a few exceptions, have had a tendency to weakness, which has made the buyer simply crazy, and caused him to lose his nerve, if he ever had any. Prices on Wire and Wire Nails have been rather the worst in this respect, and have acted "too ridiculous for anything." Starting in with the Columbia Wire Company boom early in the year, which "died a-burnin'," they have gradually settled to a point never before heard of—not dreamed of, by even the most bearish of buyers—and what the outcome is to be is a conundrum we shall have to give up.

The Builders' Hardware trade has continued good until very recently, when our winter weather set in in earnest and called a halt on building operations.

Retailers report the holiday trade as having been rather better than usual this year.

Bicycles are now compelling the attention of the Hardwaremen. There are comparatively few dealers who handle them, but it is a trade that legitimately

belongs to them and there is a good profit to the retailers, and we should advise all those who have not made arrangements for a good wheel to do so at once or they will simply not be "in it" when the trade opens in the spring; for notwithstanding the number of new wheels there are on the market the demand is still in excess of the supply and increasing.

What the Columbian year will bring forth to the Hardwareman is hard to foretell, but we hope it will be one of peace and prosperity for all.

#### Portland, Ore.

**FOSTER & ROBERTSON.**—We have been treated to a surprise in the way of winter weather. Snow fell for the first time this winter on December 22, and the fall in a little over 48 hours amounted to 24 inches. This beats the record, and the oldest inhabitant has no story to match at this time. Of course this has interfered with trade, practically putting an end to the old year's business. Trade held up fairly well until snow blocked the railroads. Collections are harder than ever to make.

There is no movement of wheat to speak of, and the foreign demand is slack and prices very low. In some sections tributary to our market wheat will only bring 40 cents per bushel, and farmers desire to hold their grain where they can, hoping for a better market in the spring.

The merchants in the interior that have extended credit consequently find it very hard to meet their obligations. The prospects for trade during the coming year are not as bright as we would wish. Prices show no material change since our last.

#### Philadelphia.

**SUPPLEE HARDWARE COMPANY.**—During the past two weeks the annual stock inventory has been the absorbing interest of the jobbing trade, and but little new business is looked for or anticipated until, at least, after the first week or ten days in January. In the interim clerical forces have their hands more than full pricing and extending the inventory stock books and opening new ledgers for the year 1893, and, taking it altogether, clerical forces are never so taxed as at the closing of the old and opening of the new year.

There probably has never been a better showing in the volume of trade for the year than that exhibited the last two weeks of November and first three weeks of December, 1892, and all the jobbing houses were compelled to delay the time-honored custom of yearly inventory from one to two weeks beyond the usual time.

The demand for season goods has been exceptionally large, and upon some lines the situation was not realized by the interior merchants until they made up their orders too late in the season to obtain goods they desired.

Plated Ware has been in active demand; indeed, early in December there was no assortment from which to make a general selection either in hands of jobbers, manufacturers' agents or manufacturers themselves, and later in the season we ourselves were compelled to return several orders voluntarily sent us, rather than retain

them with the expectation of being able to give satisfaction in completion of these orders, as our experience had already shown there was almost a certainty of disappointment in obtaining the goods, and thus dissatisfying customers.

The inability of either the jobber or the manufacturer to supply the Skate demand, which came in November and December, probably caused more disappointment, and in some cases ill feeling, than was ever before known.

The transfer of almost the entire Skate production heretofore made in Germany for export to United States to the manufacturers located in this country meant an increase of product to the American manufacturers not fully realized or appreciated by either the manufacturer or dealer.

During the years 1890 and 1891 we do not think an estimate of 50,000 pairs of Skates imported from Germany in each of those years an overestimate. These imported Skates were scattered throughout the country, and were largely in the hands of the sellers before October 1 of each year; but for the year 1892 improved styles were gotten up by the American manufacturer, and the low price at which those new and improved styles were placed to the trade made the importation of the German Acme Pattern Skate for the year 1893, a dangerous experiment; and it would have required an unusual amount of nerve for the American manufacturers to have been willing to have made up this additional quantity of Skates, anticipating the large increase to their production, without more encouragement at least six months in advance of the Skate season than was given them.

It is difficult to convince the interior merchant of the importance of placing orders for season goods in advance of the season. The answer usually is, "Oh, we can get all the goods we want. If one house cannot supply them, others can." In this they are frequently mistaken, and hence each season we find shortage on season goods.

In the case of Skates, heretofore those coming from Germany, the merchant could be persuaded to anticipate his orders. The result was there was but little trouble in supplying the later demands, but in 1892 the entire demand came the last six weeks in the year, and hundreds of merchants have been vexed and disappointed.

For ourselves, we had in one day orders amounting to over 1000 pairs of Skates which could not be supplied, and for 30 successive days it was with the greatest difficulty that we could partly satisfy our customers.

The year 1892 has been one of unprecedented activity in the Hardware trade, and when we realize the fact that one year ago we wrote to *The Iron Age* to this same effect of the trade of 1891, an estimate can be made of the increase.

The low prices now ruling have minimized the profit of the manufacturer, and the vigorous competition of the jobber has further reduced the margin of profit. It is safe to say that the extra volume of

trade is done without any greater remuneration than was secured in previous years. The margin of profit is now reduced so it is safe to predict no further clipping from the profits is possible without disastrous results.

It is quite probable that the profit derived from the sales of \$1,500,000 worth of goods at the present date is but little, if any, greater than it was on \$150,000 worth of sales 30 years ago.

From this estimate the interior merchant can form some intelligent idea of the large amount of work and detail necessary in order to reduce the expense account to the lowest minimum point.

The losses from failures during the year 1892 were less than those of the preceding year, and the monthly collections during the year were quite equal to those of the two preceding years. In certain sections of the South there were some months when payments were delayed, but that section recuperated simultaneously with the more active demand and more remunerative prices in cotton.

The indications for the year 1893 from this point are encouraging. While scattering clouds may be visible in the minds of some, we see no reason to take other than an encouraging view for the year 1893. It is not likely that the prices of Hardware will or can recede, unless it may be temporarily from cases of misunderstanding or jealousy of some manufacturers, who may think it wise to do business for a short time even at the risk of loss in dollars and cents. The present outlook is for some few advances in the near future.

### Notes on Prices.

**Cut Nails.**—The Cut Nail market continues sluggish and without special feature. The demand is small but stocks are not increasing, owing to the largely diminished production as the result of the agreement among the Eastern manufacturers and the usual stoppage for repairs. Quotations continue on a basis of \$1.40 for carload lots at mill on a 35-cent average. Prices in New York city are \$1.75 to \$1.85 for small lots from store. Carload lots on dock are held at \$1.60 to \$1.75, according to average.

*Chicago, by Telegraph.*—Cut Steel Nails are quiet, factories being shut down for repairs. Very cold weather is interfering with outdoor work, so that consumption is light at present, and manufacturers recognize the futility of endeavoring to force sales at such a time. They continue to quote \$1.60 on a 30-cent average. Small lots are unchanged at \$1.65 to \$1.70 from stock.

**Wire Nails.**—The Wire Nail market continues weak and irregular, and it is understood that Nails have been sold at lower figures during the past two weeks than ever before. The market is represented by the quotation of \$1.40 for carload lots at mill, and some of the manufacturers refuse, under any circumstances, to make concessions from this figure. It is, however, understood that orders have been

placed by some of the largest houses in the country at \$1.35, but these orders were for exceptionally large quantities, and this quotation is not to be taken as representing the market on ordinary round lots.

*Chicago, by Telegraph.*—Wire Nails are quiet on account of the light consumption. Rumors that heavy buyers are in the market to cover future requirements were in circulation last week. Large lots are quoted at \$1.55, Chicago, from mill. Nearby manufacturers quote \$1.60 firm on carloads and mixed carloads of Nails and Barb Wire, and report a fairly active trade on that basis. Small lots are selling at \$1.70 to \$1.75 from stock.

**Barb Wire.**—We quote Barb Wire at \$2.35 to \$2.40 for Four-Point Galvanized in carload lots at mill, these prices being pretty closely adhered to. The market appears to be characterized by a somewhat better tone, and manufacturers are pursuing a conservative policy with reference to orders for future delivery. The regular quotation for small lots from store in New York is \$3.10 for Four-Point Galvanized, an abatement of 10 cents being made in carloads.

*Chicago, by Telegraph.*—Barb wire is steadily growing in demand, and prospects are brighter than ever for a large spring trade. Manufacturers quote carload lots at \$2.25 for Painted and \$2.70 for Galvanized, and state that they are in some cases able to get an advance on these figures. Larger lots are, of course, selling at lower prices than carloads, but manufacturers claim to have been able to secure an advance on such sales during the past week. Small lots from stock are still in selling at \$2.30 and \$2.75.

**Shot.**—Under date January 2 the manufacturers of Shot, without making any change in their regularly announced prices, quote them in a different form. The quotations at present are given as below, it being stated that in lots of 2000 pounds and upward taken at one time a discount of 5 cents per bag of 25 pounds will be allowed; terms, net cash 30 days, or 2 per cent. for cash in 10 days:

Drop Shot, sizes smaller than B, per 25-pound bag.....	\$1.45
Drop Shot, B and larger sizes, per 25-pound bag.....	1.70
Buck and Chilled Shot, per 25-pound bag.....	1.70
Dust Shot, per 25-pound bag.....	2.00
Drop Shot, sizes smaller than B, per 5-pound bag.....	0.35
Drop Shot, B and larger sizes, per 5-pound bag.....	0.40
Buck and Chilled Shot, per 5-pound bag.....	0.40
Dust Shot, per 5-pound bag.....	0.45

Freight is equalized with New York, Philadelphia, Baltimore, Pittsburgh, Cincinnati, Chicago, St. Louis, Kansas City, Omaha and St. Paul. The price at New Orleans has been advanced 3 cents per bag of 25 pounds. A change is also made in regard to Gunnies or Pockets, which will be credited at the prices charged if returned in good order, without deducting freight as heretofore.

**Stanley Rule and Level Company.**—This company make no changes in the discounts on their entire line of Tools. They

call attention to a new form of Plane Iron recently adopted by them, and for which they claim improved features. These are fully described in another column of our paper.

**Practical Saw Jointer.**—A. E. Rogers, Melrose Highlands, Mass., manufacturer of the Practical Saw Jointer, a description of which appeared in our last issue, quotes these goods at \$4 per dozen.

**Wrought Butts.**—The manufacturers of Wrought Butts have adopted a new list correcting the inequalities which have existed in the one which has been in use for so long a time. We give below the list of the Stanley Works, New Britain, Conn., and 78 Chambers street, New York, which is subject to a discount of 40 per cent.:

Size. Inches.	Narrow and Lt. Nar- row, Nos. 800 & 833.	L. Pin. Light Narrow, No. 840.	Light Parliament, No. 832.
1/4	\$0.16	.....	.....
1	.18	.....	.....
1 1/4	.20	.....	.....
1 1/2	.25	.....	\$0.31
1 3/4	.28	.....	.36
2	.31	.....	.40
2 1/4	.36	.....	.45
2 1/2	.38	.....	.50
2 3/4	.45	.....	.55
3	.48	.....	.64
3 1/4	.60	.....	.95
3 1/2	.73	.....	1.05
3 3/4	.96	.....	.....
4	1.05	.....	1.30
4 1/4	1.30	.....	1.30
5	1.65	.....	.....
5 1/2	2.15	.....	.....
6	2.60	.....	.....

Size. Inches.	Reversible, No. 804.	Broad, No. 805.	Reversible, with tips, Nos. 822, 823.	Light Re- versible, No. 834.	Light L. Joint, No. 836.
2 x 2	\$0.50	\$0.40	\$1.30	\$0.50	\$0.50
2 x 2 1/4	.52	.48	1.50	.52	.52
2 x 3	.62	.....	.....	.62	.....
2 1/2 x 2 1/2	.57	.....	1.50	.....	.....
2 1/2 x 3	.65	.55	1.60	.65	.....
3 x 2 1/4	.75	.65	.....	.75	.....
3 x 2 1/2	.85	.70	1.75	.....	.....
3 x 3	.95	.85	1.85	.....	.....
3 x 3 1/4	1.05	.95	2.00	.....	.....
3 1/2 x 3 1/2	1.25	1.10	2.05	.....	.....
3 1/2 x 3 3/4	1.35	1.25	2.15	.....	.....
3 1/2 x 4	1.55	1.45	2.35	.....	.....
4 x 3 1/4	1.55	.....	2.50	.....	.....
4 x 4	1.65	1.55	2.65	.....	.....
4 x 4 1/4	1.75	.....	2.85	.....	.....
4 x 5	1.85	.....	3.05	.....	.....
4 1/2 x 4 1/2	1.90	.....	3.00	.....	.....
4 1/2 x 5	2.15	2.00	3.20	.....	.....
5 x 5	2.35	.....	3.50	.....	.....
5 1/2 x 5 1/2	2.35	2.35	4.00	.....	.....
6 x 6	3.80	3.55	5.85	.....	.....

Size. Inches.	Table Hinges and Square Flaps, No. 810, 816.	Back Flaps, No. 814.	Light Inside Blind, No. 842.	Light Inside Beveled Edge, No. 843.	L. Pin Light Inside, No. 844.	Few Door, No. 818.	Chest, No. 820.
1/4	\$0.24	.....	.....	.....	.....	.....	.....
3/8	\$0.24	.26	.....	.....	.....	.....	.....
1	.26	.28	\$0.21	\$0.41	.....	.....	.....
1 1/8	.28	.31	.24	.44	\$0.34	.....	.....
1 1/4	.31	.34	.26	.47	.36	.....	.....
1 1/2	.36	.38	.28	.52	.38	.....	.....
1 1/2	.38	.43	.31	.60	.40	\$0.43	\$0.60
1 1/4	.43	.47	.....	.....	.....	.....	.....
1 1/4	.47	.52	.36	.64	.....	.....	.....
2	.52	.57	.....	.....	.60	.85	.....

**Glass.**—The cold weather with snow and storms during the past week has caused somewhat of a suspension in building operations throughout the country, and will probably cause a lull in shipments of Glass from the factories. Most of the factories, however, report small stocks on hand and plenty of orders. Local trade is about at a standstill, though the price is firm, and no disposition is shown to force sales at a sacrifice of profits. The price of imported Glass remains unchanged. It is reported from Pittsburgh that a general agent has been appointed by the Plate Glass manufacturers of the United States to sell the product of the 11 Plate Glass factories and to distribute the orders. All orders will pass through the agent's hands and will be distributed by him between the factories on the basis of production. Headquarters will be in Pittsburgh, and it is understood the arrangement will go into effect about the middle of the present month. Quotations on Glass are as follows: American Window Glass, 1000-box lots or more, 80 and 15 per cent. discount; carloads, 80 and 10 per cent. discount; less than carloads, 80 and 5 per cent. discount. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and  $7\frac{1}{2}$  per cent. discount to 60 and  $2\frac{1}{2}$  per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

### Cut Nail Cards.

**T**HE CUT NAIL MANUFACTURERS are giving a good deal of attention to the question as to whether or not anything will be gained by a revision of the Nail card. On this point there is a wide divergence of opinion among them. The matter is regarded from a good many different points of view, and thus far no agreement has been reached on the subject. At the meeting between representatives of the manufacturers of the East and West the question will doubtless receive careful and thorough discussion and it will be a gratifying matter if a decision satisfactory to all concerned can be reached. As touching on this whole question, we take pleasure in giving the following discussion of the subject which is from one of the most prominent Cut Nail manufacturers in the country:

What is the matter with the present Cut Nail schedule of extras? and why or how can a change in same be of any lasting benefit to the Hardware trade or the manufacturers of Cut Nails? The above questions are suggested by the efforts of an association of Hardware dealers on the one hand, and a Western manufacturer on the other, to try and do away with the habit of selling Cut Nails on the basis of average and their seeming conclusion that the present condition of Cut Nails is all on account of the present schedule of extras governing the different sizes of Cut Nails. This conclusion would seem to be reasonable from a hasty glance over the situation, or from the position occupied by the buyer, but to one familiar with conditions governing the situation from a manufacturer's standpoint, cannot in justice to that interest be entertained. It seems to the writer that the whole trouble

is directly chargeable to competition, and that the only remedy that can be successfully applied is to do away with that, and let the present schedule stand, as it is about as good and equitable, when all interests are considered, as any that could be devised. It is true that on some sizes and special Nails that are made the extras are high, but not absurdly so, as one writer intimates. In every instance a critical investigation will show that these high extras are imposed on account of reduced output, or the trouble incident to changing machinery to make a few kegs of special Nails that are wanted at uncertain intervals.

For the sake of an illustration let us build a modern Cut-Nail plant on paper (it would not be profitable to do so anywhere else). We will start with 175 machines, and if we want to have enough capital to run smoothly by the time we get ready to commence business, we will have an investment of say \$400,000. This plant if run, say, ten months of the year, will make about 425,000 kegs of Nails, assorted sizes. There will be some difference in the cost of the various machines, but this feature is so slight that in making calculations it need not be considered. I assume, for the sake of argument, that the Hardware trade will concede that over and above the wear and tear, taxes and risks of business, this investment ought to pay a net profit to its stockholders annually of \$42,500 in order to be a satisfactory investment. In order to do this, the output must be sold at an average profit of 10 cents per keg. It was this idea which prompted the present schedule, and in order to get this average it is necessary that a sharp advance should obtain on the small Nails. Take two machines in the same factory, one making 10d and the other 3d Fine. The one making the larger Nail will turn out 18 kegs per day, the other two. If the manufacturer gets a profit of 6 cents per keg on the larger Nails and 54 cents per keg on the smaller, is it not one and the same thing to him? Will he at the end of the year have any more profit to divide among his stockholders if he runs his entire machinery on one size or the other? I think not, and experience will teach that I am right. The above illustration could be carried through the whole list of sizes, but it would only take time and space. There are some sizes of Cut Nails so small that a machine's entire day's work amounts to less than one keg. These Nails must pay a sharp advance in the schedule as an inducement for their manufacture, or they will be discontinued. It has been suggested that these high extras be taken off, and the advance in the schedule be made great enough to cover cost, to which an equal number of cents per keg be added from time to time, as the market would stand it, to represent profit. This plan would not be of permanent benefit, as it would only change the system of figuring averages from the small to the large Nails. I am led to the above conclusions from years of observation and experience, and think that the only solution for the present unfortunate condition of the Cut and I may add Wire Nail business, also, lies through the path of less competition and a united effort of each of us to "tote fair," and not labor under the delusion that the Great Father has endowed some of us with so much more ability than others.

STRANSKY & CO., 255-267 Canal street, New York, importers of Enamelled Ware, send illustrated circular and price-list, with cuts printed in color to correspond with the goods. The goods shown are full nickel-trimmed Tea Pots, all white; Fancy Tea and Coffee Pots, assorted colors, with fancy nickel covers, and similar goods

with tin covers. Also a line of adamant Tea and Coffee Pots with both tin and enameled covers.

### Cleveland Twist Drill Company's Catalogue.

**CLEVELAND TWIST DRILL COMPANY**, Cleveland, Ohio, makers of Increase Twist Drills, Self-Feeding Reamers, Taps, Cutters, &c., issue an 1893 catalogue handsomely printed on excellent paper, bound in flexible cloth covers, containing list prices and illustrations of the above goods. The manufacturers state that their Drills have a flute of equal area from point to shank, and that micrometer calipers are used throughout their entire factory and that sizes of special tools ordered should be given in thousandths of an inch. Included in the catalogue are several lists of tools in their line never before published, and more sizes of the ordinary drills are listed than is ordinarily the practice. All tools listed are kept in stock. A millimeter list is published for the convenience of manufacturers who wish to buy twist drills from stock either smaller or larger than the ordinary sixtieths sizes; and there is also given in the millimeter lists the decimal equivalent, so that the millimeter sizes best suited to customers' needs can be selected.

### It Is Reported—

That fire was discovered in the cellar of R. J. Humphrey's Stove and Hardware Store, Delaware, Ohio, on December 26, and was only extinguished after considerable damage had been done.

That the Hardware store of Steteler & Carroll, Quanah, Texas, was destroyed by fire on December 20.

That James Shaw and W. H. Newman, Marlborough, N. Y., are erecting a two-story building, which on completion will be occupied by them as a Hardware, Stove and Tin store.

That W. A. Stuart, Livermore Falls, Me., who recently purchased the stock of Hardware of George Chandler, has connected the two stores by an addition.

That C. O. Hill, Hardware dealer, Dawson, Minn., has sold out.

That M. H. Lynch succeeds J. D. Smith in the Hardware business at Swanville, Minn.

That M. A. Parke has opened a new Hardware store at Joplin, Mo.

That on Thursday, December 20, Horace B. Shattuck, the well-known Hardware dealer of Lowell, Mass., completed his fiftieth year in active business.

That J. W. Prothero, Du Bois, Pa., has removed to larger and more commodious quarters.

That Gaspar & Le Claire, Hardware merchants, Waukesha, Wis., have sold out to a new firm under the style of Gaspar & Lyons.

That George C. Whitmore, Clarence Sleister and Harry Rummell have purchased the Hardware and Farm Machinery business of C. M. Houghton, Delavan, Ill.

That Konow & Donovan are a new Hardware firm at Ivesdale, Ill.

That Allen & Kennedy have entered the Agricultural Implement business at Monongahela City, Pa.

That on January 1 the partnership between Hall & Nelson, dealers in Hardware, Pittsburgh, Pa., was dissolved. F. W. Hall & Co. now conduct the business.

That S. R. Ferguson will soon open a new Hardware store at Bristol, Tenn. Mr. Ferguson has for the past five years been traveling for the Todd-Dunigan Hardware Company of Louisville, Ky.

That J. W. Baker has purchased the Hardware stock and good-will of Breckman & Hunt, Los Angeles, Cal.

That James I. Wyer and F. J. Hunt, dealers in Hardware, Red Lake Falls, Minn., have consolidated under the name of Hunt & Wyer.

That John Macready & Co., Tacoma, Wash., wholesale and retail Hardware dealers, have been incorporated.

That burglars broke into the Hardware store of A. T. Gidley, Roann, Ind., on the 18th inst., and secured Cutlery and Fire Arms valued at \$200.

That the Hardware stock of Robbins & Edwards, Ypsilanti, Mich., has been sold to Frank I. Carpenter of Baltimore, Md., who will take charge at once.

That F. Seifert, dealer in Hardware, Jefferson, Wis., has been succeeded by A. N. Trossen.

That George Woodruff's Stove store, Tariffville, Conn., was burned on the 20th inst. Loss, \$9000.

That thieves broke a window in R. T. Jackson's Hardware store on Federal street, Pittsburgh, on the 18th inst., and got away with \$25 worth of Cutlery.

That T. C. Dobbins & Co., Dayton, Ohio, are selling out their stock of Hardware, intending to retire from business February 1.

That the firm of Morris & Co., Tinware dealers, Lynchburg, Va., has been dissolved, Mr. Ryan retiring. The business will be continued by Mr. Morris under the old firm name.

That Todd & Hawley, San Diego, Cal., wholesale and retail Hardware, have disposed of the retail branch of their business to San Diego Hardware Company.

That the Bell Hardware Company, West Lebanon, Ind., have disposed of their business to F. J. Goodwine and Alonzo J. Miller.

That Tippin & Smith succeed B. E. Cook in the Hardware and Implement business at Church Hill, Md.

That William Sherman has commenced the Hardware business at Manchester, N. Y.

That Elliot & Kennedy are a new Hardware firm at Hamilton, Ohio.

That Charles F. Hellyer has bought out the Hardware, Stove and Tin business of J. B. Rhodes, Sarahsville, Ohio.

That Logan & Higgins are successors in the Hardware business to Thompson Bros., Lexington, Ky.

That Edward M. Francis has been admitted into the Hardware firm of Francis & Co., Hartford, Conn. Mr. Francis had been a clerk in the establishment for 18 years. This business was established in 1799.

That the Williams Hardware Company, San Francisco, Cal., will soon move into new quarters.

## Preston Brothers' New Store.

PRESTON BROTHERS, Norwich, Ct., are making extensive alterations in a building which they will occupy, the changes are to be completed, according to contract, by April 1, 1893. The building, corner of Main street and Rose place, will be so arranged as to give the firm a room 45 x 103 feet in size, with basement of the same dimensions, and a storehouse 48 x 53 feet, obtained by carrying up the rear extension a second story. The

store will be lighted by plate glass windows at front and back, and large skylights in the center. The entrance will consist of double doors, which when open will give a passage 12 feet wide. There will be no partitions in the store; thus a view from the front will give a clear sweep of the entire room. The wood work will be of yellow pine throughout.

The Hardware department will be located on one side of the store, with the most improved methods for handling the goods, including nearly 2000 Shelf Boxes. The opposite side of the room will be arranged for House-Furnishing Goods. Near the front of the store will be an inclosed space with desks for the proprietors, while the offices will be placed in the rear. The store will be heated by steam and probably lighted by electricity. When completed, this will probably be one of the largest Hardware stores in New England. The firm began business 11 years ago, occupying a single store; but their business has steadily increased so that they have long felt the need of more room.

## The Manufacture of Wire.

THE B. GREENING WIRE COMPANY, Hamilton, Can., issue a pamphlet entitled "Wire: Its Manufacture, Antiquity and Relation to Modern Uses," a subject to the discussion of which 23 pages are devoted. After referring in a general way to the importance which Wire has assumed in connection with the progress of the century, they refer to the history of its manufacture as follows:

The art of making Wire has been traced back to the year 1700 B. C. Gold Wire decorated the sacerdotal robe of Aaron. A specimen of Wire made by the Ninevites 800 years B. C. is exhibited at the Kensington Museum, London, England. Homer and Pliny referred to similar productions in their early writings. Metal heads, with imitation hair of Wire, recovered from the ruins of Herculaneum, are in the Portici Museum, Naples. From such remote eras up to the fourteenth century Wire in its general acceptance was produced by hammering out strips of metal, and not by the process of "drawing" as now practiced.

In the middle ages this industry was extensively pursued, and the artificers thus engaged were termed Wire smiths, but in the earliest days of the manufacture gold, silver and bronze appear only to have been used.

It is substantiated by technical records that the present method of drawing Wire was practiced in the Lenne district of Germany during the fourteenth century; and about the year 1350 a Wire drawing mill was erected at Nuremberg by a man named Rudolph.

The first needle manufactory in France was started by an Englishman, named Christopher Greening, at Saint Omer, and the town is this year celebrated the 400th anniversary of the establishment of the industry.

About 1600 A. D., it is recorded that at Tintern Abbey on the Wye, pins and needles were manufactured by a Mr. Greening.

In the year 1630, proclamation was issued by Charles I. to the effect that the home industry had made such advancement that further imports of Wire were prohibited.

They then give a brief sketch of the history of their house, after which they explain at some length the process of the manufacture of Wire, after which follows

an enumeration of some of the many uses to which Wire is put. The following extract from their account of the manufacture of Wire will be of interest:

The iron ore, after being taken from the mine, is converted into cast iron by means of a blast furnace, which, by intense heat, separates the iron from the bulk of impurities with which it is combined, the purified metal being run into rough bars technically called "pigs," and the impurities drawn off in the form of slag.

These pigs are afterward treated according to the nature of the metal required. For what is known as puddled iron, a quantity of pig and scrap iron is placed in a reverberatory furnace, and again subjected to intense heat, to further remove carbonaceous and other impurities.

The man in charge of this furnace is called a puddler, and by means of a long iron rod, with a rake or rabble at the end, he works the metal about, which has become half molten or in a pasty condition, until he has gathered a good sized lump, which is called a ball or bloom, weighing about 60 pounds. In its half molten state it is subjected to the crushing blows of a steam hammer, which further beats out any retained slag.

The next process is the heating of these blooms and passing them between a pair of powerful grooved rolls, which forms the welded iron into a bar.

This bar is cut into short lengths. A number of them are placed together and are known as a "fagot." After being brought to a welding heat in the furnace, they are subjected to the heavy blows of a steam hammer, which drives out any further slag or impurity remaining, and forming the welded mass into a billet. In this form they are taken to the rod mill to be again heated, and passing through a train of rolls, are reduced in diameter to about  $\frac{1}{8}$  of an inch, or 6 wire gauge, which is the size of rod mostly used.

This rod, now ready for the cold drawing process, is first thoroughly cleansed from scale or rust, by soaking in a vat containing sulphuric acid and water. After being immersed long enough to remove the scale, it is thoroughly washed to cleanse it from the acid and loose scale, and plunged into a vat of lime water to prevent it rusting, until the Wire drawer is ready to take it in hand.

Before going to the drawing block the end of the Wire is put into a pointing machine, which produces a tapered end, in order to pass far enough through the Wire drawer's plate or die to enable him to seize it with his tongs. By two or three pulls with his tongs he draws enough Wire through to fasten the end in a pair of vise jaws attached to the revolving block, and which form a part of the mechanism. He then starts it revolving, each coil of the Wire forcing the last further up the block until the coil is finished.

After being drawn or gradually reduced in size a few gauges, the Wire becomes so hard that an annealing process is necessary. The coils of hard Wire are therefore placed in a large iron cylinder, which is hermetically sealed and the whole mass subjected to fire until it becomes a bright red. After being kept at this heat a suitable length of time, to insure thorough softening, it is allowed to cool slowly, when it again receives another cleaning and coating, and is further reduced by repeated drawings until brought to the size required.

Iron and steel Wire is drawn through chilled iron or steel dies, but some of the precious metals are now drawn through diamonds or rubies, drilled at an immense expenditure of labor. To make one of these dies requires many days of continuous drilling. The delicacy of the work may be appreciated when the size required is represented by the diameter of a hair.

## PRIZE COMPETITIONS.

**W**E HEREBY ANNOUNCE a series of six prize competitions relating to trade matters in which our readers are interested. Four prizes of \$50, \$25, \$15 and \$10 will be awarded in each competition.

The competitions are open to all and a general participation on the part of the trade is invited.

We shall have the privilege of publishing any or all of the contributions received.

The committee of award in assigning prizes will take into account the merit of the different contributions and their suitability for publication.

### PRIZE COMPETITION No. 6.

#### How Retailers Can Best Advertise and Extend Their Business.

The object of this competition is to obtain practical suggestions as to the methods which the retail dealer in Hardware, Stoves, Tinware, &c., can advantageously adopt in building up his business, and is intended to cover such points as the following :

Advertising in the local papers, with suggestions as to how such advertising should be done and to what extent ;  
The manner in which circulars and other printed matter may be used ;  
A description of any special or unusual methods of attracting and holding trade ; and  
General suggestions in regard to ways in which the business can be extended.

An account of any methods which have been found useful in building up trade will be suitable under this competition.

First Prize.....	\$50.00
Second Prize.....	25.00
Third Prize.....	15.00
Fourth Prize.....	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96-102 Reade street, New York, and marked Prize Competition No. 6.

### PRIZE COMPETITION No. 7.

#### Travelers' Yarns.

The traveling salesman is proverbially happy in the stories which he narrates, and this competition is for the purpose of calling out a collection of good yarns for publication. While the attention of travelers is specially invited to this competition, it is open to all. Stories relating more or less closely to trade or business matters will be preferred.

First Prize.....	\$50.00
Second Prize.....	25.00
Third Prize.....	15.00
Fourth Prize.....	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96-102 Reade street, New York, and marked Prize Competition No. 7.

### PRIZE COMPETITION No. 8.

#### How to Treat Clerks.

Under this competition, beside a general discussion of the subject, such questions as the following may be considered :

The extent to which clerks should be given an opportunity of obtaining a knowledge of the business, and of price-lists, prices, &c. ;  
Whether it is desirable to have formal rules for the regulation of employees and for the management of the store. If so, a set of rules should be submitted ;  
To what extent clerks should be held responsible for their mistakes ;  
Suggestions as to how clerks should be treated in order to secure their most intelligent and efficient work ;  
Mistakes made in the treatment of clerks.

This competition opens an important subject and it is hoped that it will be discussed fully by merchants and by their clerks from their different points of view.

First Prize.....	\$50.00
Second Prize.....	25.00
Third Prize.....	15.00
Fourth Prize.....	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96-102 Reade street, New York, and marked Prize Competition No. 8.

### PRIZE COMPETITION No. 9.

#### Shop System of Keeping Track of Jobs.

This competition is intended to call out information in regard to methods of keeping account of the cost of labor and material on tin-shop work, repairing and new work, inside and outside. In connection with the general subject such points as the following may be touched upon :

Whether blanks or forms are used in connection with such work. (If so, samples should be submitted) ;  
What record is kept of orders, costs of jobs, charges, &c. ;  
How time occupied in going to and from the job is covered ;  
Suggestions in regard to the profitable conduct of the shop.

To illustrate the system it is desirable that a specific job (as for example, repairing down spouting and eave trough, or other job of repairing in which new material is used) be referred to and the method of keeping track of the costs in such job fully explained.

First Prize.....	\$50.00
Second Prize.....	25.00
Third Prize.....	15.00
Fourth Prize.....	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96-102 Reade street, New York, and marked Prize Competition No. 9.

### PRIZE COMPETITION No. 10.

#### Business Maxims—At Least 10.

Those entering this competition will send at least ten maxims relating to the conduct of business, presenting in a brief and pithy manner practical suggestions which may advantageously be followed.

First Prize.....	\$50.00
Second Prize.....	25.00
Third Prize.....	15.00
Fourth Prize.....	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96-102 Reade street, New York, and marked Prize Competition No. 10.

### PRIZE COMPETITION No. 11.

#### How Small Retailers May Keep a Record of Prices.

The object of this competition is to call out information or suggestions in regard to the best methods to be adopted in keeping a record of prices, showing cost or selling prices, or both cost and selling prices, of Hardware, Stoves, Tinware, &c., in a small retail store employing not more than four persons in the selling and bookkeeping departments, including the proprietors. Those entering the competition are expected to give a concise and clear explanation of their system, and if a price book is used, to submit as illustrating the system at least three specimen pages. If a price book is referred to it may be of any design or arrangement best adapted to the purpose, and may be original with the contributor or may be one of the different price books on the market. Fictitious names should be used instead of the real names of jobbers and manufacturers.

The committee in awarding prizes will take into account the merit of the different systems described, the character of the descriptions given, and the general utility and interest of the contribution.

First Prize.....	\$50.00
Second Prize.....	25.00
Third Prize.....	15.00
Fourth Prize.....	10.00

This competition will be open until the close of business February 18, 1893.

Contributions should be addressed to David Williams, 96-102 Reade street, New York, and marked Prize Competition No. 11.

### Annual Dinner.

**S**ICKELS, SWEET & LYON, jobbers of Hardware, 35 Barclay street and 40 Park Place, New York, have a pleasing custom of giving annually at the close of the year a dinner to the members of their establishment. The third of these dinners was given Thursday evening, December 29, at the Metropolitan Hotel in this city. This method is taken by the house for the promotion of good fellowship and acquaintance among those associated together in business and shows the interest felt in the welfare of the force by the heads of the firm. This sentiment is sure to be reciprocated and bear fruit in the direction of increased efficiency and devotion to the firm's affairs, which, after all, only emphasizes the fact that the interests of both are mutual. Covers were laid for 35 guests at one table extending lengthwise of the room. The table had been appropriately decorated with evergreens, flowers, set pieces of the confectioner's art, banquet candelabra, &c., and a *boutonnière* laid beside each plate. An innovation this year was the presence of ladies, six of whom, members of the families of the hosts, were placed at a separate table at the east end of the room, on a raised platform affording a view of the whole assembly. Robert Sickels presided, while the junior members of the concern sat at the center of the table on either side. Dinner was announced at 6.30 p.m., and for about two hours the attention of the company was mainly given to the consideration of a *menu* that in variety, quality and preparation was all that could be desired. The service was excellent. After the coffee and cigars (this being a strictly temperance dinner) an hour was enjoyably spent in conversation. There was some instrumental music from the grand piano, a few college and popular songs were sung, and those so inclined danced; the whole being delightfully informal. There were no speeches. Letters of regret were read from J. S. Edwards and G. W. Dwelle, former employers. Among those present, some of whom have been connected with this house and its predecessors for from 15 to 22 years, may be mentioned J. R. Loder, Arthur Fuller, A. B. Coles, E. C. Hamilton, G. W. Whiting, J. K. Eldridge, J. Ingoldsby, E. C. Hilton, Edw. Tolman and Otto Dederer. About 9 o'clock three rousing cheers were given the entertainers and the party dispersed.

### A Pleasant Occasion.

**T**HURSDAY EVENING, December 29, the Hardware house of Buehler, Bonbright & Co., Philadelphia, tendered a supper to their employees, the object being to draw the employers and the 55 employees into friendly contact, in which it certainly was successful. After a bounteous repast, addresses were made by members of the firm on matters connected with the business, and the interest taken demonstrated hearty appreciation, as was shown in the replies from the heads of the various departments. Recognition of the

fact that an assemblage of this character cannot prove otherwise than mutually beneficial should have a tendency to induce other Hardware houses to adopt a similar course. It is gratifying to an employee to know and feel that his employer appreciates his efforts, and is the means of encouraging him in endeavoring to attain the best results for his employer. The interest aroused by this brief period of social intercourse will doubtless be more fully realized in the business for the year 1893.

### Bicycles.

#### THIRD ARTICLE.

**T**HE MCINTOSH-HUNTINGTON COMPANY, Cleveland, Ohio, are exclusive agents for the United States for the sale of the Crypto Geared Ordinary and Front Driving Safety, which is somewhat of a new departure in cycling, having been introduced for the first time during the season of 1892 in England. Like everything new, opinion is divided in regard to its merits, but the record that it has made in England is considered very favorable. In Safety Bicycles their leading machine will be the Sunol, which is manufactured for them at a factory in Chicago, the entire production of which they control. This Bicycle will be built in three weights—full roadster, 35 to 36 pounds; light roadster, 30 to 31 pounds; and track racer, 25 pounds. The special features of merit are in its great strength, its uniformly high grade construction and a number of devices in connection with it, which add to its utility. They will also control the King and Queen of Scorchers in a number of States, the line consisting of the K. O. S. track racer, weighing 20 pounds. the Path Racer, roadster, and the Q. O. S., also a roadster. The Road King and Road Queen they also control in some States, these machines for '93 being much reduced in weight. The Hercules is manufactured expressly for the company, and is designed to meet the demand for a good wheel at a medium price. It has a full diamond frame, and is made in three sizes, 24, 26 and 30 inch. The Stella is also manufactured expressly for them, and is of the convertible pattern, suitable for either ladies or gentlemen, made in 26 and 28 inch sizes. The plan adopted by the company for marketing wheels is to give control of the sale of a machine to one merchant in each town and to abstain from selling his competitors.

**S**ERCOMBE-BOLTE MFG. COMPANY, Milwaukee, Wis., have a line of Wheels for '93, consisting of a Telegram Roadster, 38 pounds; Telegram Light Roadster, 31 pounds; Ladies' Telegram, 33 pounds; Chainless Telegram, diamond frame, 26 pounds; Lightning Messenger Racer, 27 pounds, and the special Sanger Racer, built to order only and made to reach 24 to 26 pounds. Their entire line of wheels is made materially reduced in weight from last year's wheels, and the frame of the Ladies' Telegram is slightly changed, making it a decided improvement over last year's wheel. Their line of wheels is referred to as having been improved,

making it fine and complete, and comparing favorably with any line of either American or foreign machines, and fully equipped in the way of useful novelties of their Mr. Bolte's invention. They also manufacture S. B. pneumatic wheels for ordinary trotting sulkies.

**T**HE EAGLE BICYCLE MFG. COMPANY, Torrington, Conn., will continue to make, as they have in the past, only high grade goods. Their line will comprise a road machine of 30 pounds, a racing wheel for advance riders, also a ladies' wheel, the latter weighing about 30 pounds. Their line is now on the market, and their agencies are all placed. Their dealings in the future will only be with representative houses, those dealing in Hardware and sporting goods in particular. It is the belief of this company that the future outlook for their business, and for all those who manufacture strictly high-grade goods, is very bright, and that bicycles properly introduced through the regular channels of business will prove a profitable line for any progressive dealer in Hardware or sporting goods to handle.

**T**HE CHAPMAN HARDWARE COMPANY, Toledo, Ohio, will handle for 1893 Columbia Tourists, made by the Geo. R. Bidwell Cycle Company; Psychos, an imported machine; Hartfords, made by the Hartford Cycle Company; Lovell's, made by the Jno. P. Lovell Arms Company, and the Western Wheel Works' line, made by the Western Wheel Works, Chicago. The company market the wheels they handle by the old method of traveling salesmen.

**P**REMIER CYCLE COMPANY, 846 Eighth avenue, New York, have invented and patented a new tubing which will be used exclusively in Premier Cycles of 1893. This tube has been registered under the title of the Helical Tube, and the manufacturers state that practical and repeated tests prove it to be 50 per cent. stronger than the best weldless tubing, at exactly one-half the weight, while in durability and adaptability to cycle construction it is fully the equal of the latter. They guarantee their Helical Tube Premiers to give equal service with the best machines they have turned out in past years and at a reduction of from 25 to 35 per cent. in weight. Their line of wheels for 1893 will embrace the following patterns: Premier Roadster with 28-inch wheels, 1893 Dunlop tires, mud-guards, brake, foot rests, saddle and pedals complete; weight 33 pounds, stripped 29½ pounds. Premier Road Racer, 28-inch wheels, 1893 Dunlop tires, foot rests, saddle and pedals complete; weight 26 pounds, guaranteed for road use. Premier Racer, 26-inch wheels, 1893 Dunlop racing tires, adjustable handle bar, saddle and pedals complete; weight 19½ pounds, guaranteed for track use. The frame of this machine weighs 3½ pounds complete. Ladies' Premier, 26 inch wheels, straight double-tube frame, 1893 Dunlop tires, mud guards, chain case, brake, foot rests, saddle and pedals complete; weight 30 pounds. Weldless Premier, 30 inch wheels, 1893 Dunlop tires, brake, guards, saddles and pedals;

weight 38 pounds. These machines are all of the latest designs, gracefully proportioned and mechanically correct. The new Dunlop wired tire which they use is referred to as the fastest, most reliable and the easiest to handle and repair.

COVENTRY MACHINISTS' COMPANY, Boston and Chicago, whose machines are known under the general name of Swift, will have for 1893 the Swift Racer, weight 20 pounds, special Humber pattern frame, any gear. The Swift, 1893, is a road wheel on the same lines as the Racer; weight, 36 pounds; stripped, 30 pounds, any gear. The Swift Geared Ordinary, geared to 66 inches, has a 36-inch driving wheel with Crypto gear, the rear wheel being 24 inches. The Swift, 1893, Ladies' No. 1, is a special light machine, weighing 35 pounds. The Swift, Model C, weighs all on 45 pounds; stripped, 41 pounds. Swift, Model D, weighs all on 50 pounds, and strips down to 45 pounds. A special effort is being made on the Model D machine, it being warranted to be of the highest grade of materials and construction, and of the latest, modern, high-class design. It is an all ball-bearing, all-forged steel machine, fine enamel and nickel finish, roller chain, Swift spokes, and Garford saddle.

### Supplee Hardware Company Dinner.

AMONG one of the many enjoyable events that are usually given to speed the parting and welcome the coming year was the complimentary dinner given to the salesmen of the Supplee Hardware Company by the president, W. W. Supplee, on New Year's Eve, at the Union League Club in Philadelphia. About 30 guests partook of the hospitality of the genial and affable host and discussed a *menu* from Blue Points to coffee, with a gusto that spoke well for the *chef* and to the satisfaction of the host. It was the intention of Mr. Supplee to have had such a gathering last year, but owing to the impossibility of getting all the salesmen together at that time it had to be deferred, but most happily the event was consummated this year, and it is safe to say that it was the initial dinner of many more to follow.

The occasion was one of eminent good cheer and good will, as well as a beneficial interchange of the expression of feeling of each one present, and Mr. Supplee knows to-day more of the loyalty and sincerity that prevails among those around him than he ever did before, and it is likewise sure that the bond existing between each and every one present was more firmly cemented than ever. Such occasions do more to bring closely together employer and employee than any other one thing, as well as to give strength and courage to those who might waver or doubt, and to make each one feel the determination to do his utmost for the success of the company. Mr. Supplee was in a happy vein, and prefaced his remarks with the story of the old darkey minister, who, on arising in his pulpit, said that "he had no idea

what he was going to say, but would rely entirely on Providence to guide him, and then if he made any mistakes you must blame Providence and not him."

His remarks were so well timed, and so happy in detail and point, that "he who runs might read," and we are advised by one who was present that this meeting around the well-spread board did more to clearly bring before all the desires and wishes of Mr. Supplee, and to present in a concise manner plain business facts and principles, than a whole world of correspondence would do.

It was certainly a flattering expression of co-operation and good feeling, and was heartily appreciated by Mr. Supplee, who has by his actions and manner to those around him endeared himself to all.

The occasion was enlivened with music, song and speech, and as the fleeting moments of the old year announced that its course was run, the entire company arose and joined in singing "Auld Lang Syne," which was given with a will, and with hand shakes and good wishes for the new year terminated a season which has closely woven itself around the hearts of all present.

### Export Notes.

PRESIDENT DIAZ of Mexico has recently granted an important concession to T. E. Kennell, representing a syndicate of American capitalists, for the establishment of four extensive jute factories in different parts of the Republic. The concessionnaire must invest at least \$2,000,000 in the enterprise, work on the first factory to begin within nine months and the building to be completed within three years. The construction materials and machinery for each factory will be admitted to the country free of duty. The capital invested, the buildings and the business will be exempt from all taxation, except the stamp tax, for ten years. For ten years no similar franchise with greater privileges will be given by the Government to any other person or company. A deposit of \$10,000 in bonds of the public debt must be made by the concessionnaires within six months from date as a guarantee.

The Colombian Congress has given authority to Dr. Nunez, President of Colombia, to do what is necessary to protect the best interests of all concerned in the Isthmus transit.

The corn market in Mexico is demoralized and there has been a great fall in prices, corn said to be selling in the City of Mexico at 60 cents a bushel, American money. On one road 200 carloads have been side tracked and could not be unloaded owing to the failure of the consignees to pay the freight, and future shipments would not be received unless the freight was prepaid and an agreement made to unload the cars on arrival at destination. The new crop of corn is coming into market and it is thought no further demand for grain will be made on the

United States. It is estimated 8,000,000 bushels have been produced in one State, besides good crop reports from others.

United States Consul Dimmick at Barbados in his last report states that American goods are winning their way there in the Hardware line. Carriages are nearly all of American manufacture, and household furniture, he says, is also largely coming into use. He suggests that American advertisers would reap greater advantages in the West India colonies if they would plainly name their prices and terms as English firms do, instead of leaving would-be purchasers in doubt until immediate demands become imperative, adding that the people will not send for information; it must come to them.

The commerce of Natal, Southeastern Africa, is steadily increasing, and with better transportation facilities, American merchants should obtain a large share of it. For the nine months ended March 31, 1891, the direct imports from the United States amounted to \$632,353, as against \$612,473 imported during the 12 months ended June 30, 1890. The importations from the United Kingdom during the same nine months were 11,038,531, and for the 12 months \$14,042,631.27. For the year ended June 30, 1891, 3.42 per cent. of the total imports originated in the United States, while 79.7 per cent. went from Great Britain. These returns are necessarily imperfect, as a considerable amount of American goods arrive at Durban, the chief seaport, by steamer via England, the figures of which are not obtainable. The United States Consul there says the American exporter is at a disadvantage, as the bulk of American imports go to Natal by sailing vessel direct from the United States, and when it is realized that an order is five weeks reaching New York or Boston; that in addition to the time required to execute the order and get it aboard the vessel, from 70 days to four months are required to land the goods in Durban; on the other hand, England has five direct steamship lines in operation, with a sixth just starting, while a German line runs monthly steamers from Durban to Hamburg, via the Suez Canal. A direct line of steamers between this country and the numerous South African ports would enable American exporters to greatly increase their trade, as the great territory of South Africa is rapidly growing in population and resources, and is a field that American manufacturers and exporters can profitably cultivate. The "Mercantile Corporation of the United States and South Africa, Limited," recently incorporated, New York office 140-142 Pearl street, is an accession to the list of merchants doing business in this field, intending to keep American goods in stock and do what is possible to enlarge the African market for our goods.

LUTTRELL & FOSHEE will soon open a general Hardware store at Brewton, Ala. The firm consists of C. M. Luttrell and S.

J. Foshee. Mr. Luttrell has been representing W. B. Belknap & Co. of Louisville in the Southern States for several years past.

## American Hardware in New Zealand.

### LETTER FROM POLHEMUS LYON,

*Our Special Representative.*

POLHEMUS LYON, of the firm of Sherman & Lyon, 100 Chambers street, New York, who for nearly two years has been our special representative abroad, sailed, December 3, from Auckland, New Zealand, on the steamship "Alameda," and after an exceptionally stormy passage arrived at San Francisco, December 22. Mr. Lyon is now on his way home, and his friends will have an opportunity of welcoming him in a few days. The trip which has thus ended is Mr. Lyon's second tour around the world, and during it he visited the trade centers of Europe, South Africa, India, and devoted a good deal of time to the important markets of Australia and New Zealand. In the letters which we have published from him we have the results of Mr. Lyon's acute and intelligent observation in regard to the condition of things in the countries which he has visited. We take pleasure in giving below a letter from Wellington, New Zealand, which bears date December 2:

This port is the natural distributing center of New Zealand, and though smaller than the three other chief cities of the colony does the largest wholesale trade, several steamers leaving every day for the different small coast towns of either island.

New Zealand has a population of about 700,000, with four large importing cities of 40,000 to 60,000 people each, and is in a much better condition commercially than Australia; this colony's excessive zeal for progress and growth, for internal improvements, &c., burdened the country some time since with a debt out of all proportion to its resources; but, as often with private individuals, the necessity stimulated heroic effort, which has been crowned with success.

New Zealand's beef and lamb and butter, as well as wool, sell freely in London; its Kauri pine competes with the American throughout Australia, and more than one vessel a month is loaded for New York with flax for our Rope manufacturers and Kauri gum for our varnish factories.

Christ Church is such an agricultural center that some of our American Mower and Reaper concerns think it of sufficient importance to have a house of their own at that point.

In the New Zealand Hardware trade there are four concerns whose sales the last

year reached \$500,000 each, on an inventory of about \$300,000, and four others did not fall very far short of this business.

It is too bad to learn that less than 20 per cent. of their purchases come from "the States." This is partly due to the poor communication with New York, fourth-class vessels averaging nearly 120 days *en route*, which means seven months from the time the order is posted before the purchase is received in stock, while cheap steam freight from England lands the goods in warehouse within 100 days after the want originated, instead of 200, enabling the buyer to realize from the purchase to meet his obligation, instead of paying for it before the goods arrive. So these houses say to me that wherever they can substitute a European line for the American they do so and really only buy of us what they have to—we would do the same in their position.

New Zealand feels a little sore that the United States continues to turn a cold shoulder to the transpacific mail service, though it is argued that Uncle Sam gets a pecuniary profit from the mail service, while New Zealand and New South Wales carry the entire burden of about \$80,000 per annum subsidy.

The Nicaragua and Panama canals have been discussed with interest by the local papers, both Wellington and Auckland arguing that each city will be the natural port between the Australias, England and America. Sir Roderick Cameron, founder of the New York house of R. W. Cameron & Co., arrived here a month ago and stimulated this discussion in newspaper interviews, stating that he saw no reason to doubt both canals would be in working order within five years from the present time, and believed that New Zealand would then exercise a wide controlling power as the key to the Pacific.

The colonial papers, before our Presidential election, all with one accord expressed every few days earnest hopes for Mr. Cleveland's success and now have much to say about the benefit accruing to the colonies in the probable canceling of our duty on wool.

If I should attempt to quote from the many misconceived editorials on our politics I would crowd this journal to no purpose. One cannot but wish that a larger number of thoughtful Americans visited the colonies, where they would be sure of the most courteous treatment, and could perhaps, by avoiding bombast and "Yankee yarns," disseminate a better knowledge of our grand institutions.

Without question foreign traveling gives an American plenty of opportunity to hear of his country's weaknesses and brings to light what he knows of the laws of his land and the policy of his Government, or how little he knows.

In bringing to an end this second trip around the world, each of which was nearly two years in duration, I must acknowledge an increasing respect and love for my native land. One hardly knows until he has learned of other lands

how proud he has a right to be that he was born under the Stars and Stripes.

POLHEMUS LYON.

## The Past Year.

MANUFACTURERS and merchants are now able, with more or less definiteness, to review the general features of last year's business and to form a pretty close estimate of its results. The matter is thus summed up by a well-known and enterprising house in the West:

Trade may be said to have been satisfactory the past year and volume of sales certainly greater than ever before. As to the profits, it will take some little time yet to determine.

Business grows, but expenses keep well up in the procession, while manufacturers cut into the profits by competing for trade rightfully belonging to the jobber. Collections were never better, and losses by bad debts cut no figure in the situation.

## Freezers.

A JOINT CIRCULAR has been issued under date December 1, by White Mountain Freezer Company, Nashua, N. H.; Chas. W. Packer, Philadelphia, Pa.; Peerless Freezer Company, Cincinnati, Ohio; Shepard Hardware Company, Buffalo, N. Y.; North Brothers Mfg. Company, Philadelphia, Pa., in which it is stated that in view of the many misunderstandings during past seasons in regard to claims for Freezer repairs and Freezers broken in transportation, the above manufacturers have adopted the following rules:

Where parts are broken in transit, in shipments made direct from factory, we will, as a matter of courtesy, supply new parts without charge and send with next freight shipment, provided:

- 1, that we are notified promptly of breakage, on receipt of Freezers.
- 2, that railroad express bill is promptly furnished, with breakage noted on same by railroad agent at destination.

If repairs are required to be sent by mail or express, they will be sent at the expense of buyer for postage or express charges.

After Freezers are received by customers in good condition we cannot be responsible for subsequent breakages. All Freezers leave our factories in perfect condition, and as transportation companies receive an extra high rate of freight to insure safe carriage, breakage, if promptly reported to them, can usually be collected from them; but they will not take claims into consideration unless presented promptly on receipt of goods.

## Unique File Chart.

KEARNEY & FOOT COMPANY, 100 102 Reade street, New York, with works at Paterson, N. J., have issued an A B C File Chart, 27 x 40 inches, with metallic ends, illustrating in a plain and forcible manner the line of Files and Rasps manufactured by them. The Files and Rasps are shown from 14 to 16 inches in length from heel to point, with sectional diagrams of the width and thickness of each file. The files are shown in outline, and on each one are sections an inch square showing the kind, and coarseness or fineness of the cut given to the file in its various lengths. For instance, on the Cabinet Rasp shape is shown sections of punched teeth given to

Rasps from 4 to 16 inches. A number of diagrams show cuts of special files quite largely used. Eleven different styles or kinds are shown on the cast, with something like 125 sections showing different cuts. The fidelity with which the cuts are reproduced and the large amount of information contained on the chart will make it almost invaluable to those interested in Files.

### Ausable Horse Nail Company.

THE LONG-PENDING litigation between the Putnam Nail Company and the Ausable Horse Nail Company has resulted, we are advised, in a victory for the Ausable Nail. For some years the Putnam Company have claimed the exclusive right to the use of the term "hot forged and hammer pointed." In 1890 they undertook to enforce this claim against the Ausable Company. The suit was vigorously contested, the records and briefs in print amounting to over 1000 pages. Judge Coxe of the United States Circuit Court has just handed down a decision fully sustaining all the positions of the Ausable Company, and containing the following complimentary reference to their business methods:

The defendants' advertisements, trademarks, labels and brands are totally different from complainants', and strongly negative the idea that any imposition was attempted or thought of. The defendant has advertised its Nails upon their own merits, believing them to be the best Nails manufactured. There has been no deception, no concealment, no false pretences. These Nails have entered the market as the Ausable Nails and what reputation they have gained has been under their own name and upon their own merits.

### Trade Items.

FAYETTE R. PLUMB, Frankford, Philadelphia, for the better accommodation of his customers in Chicago and the West, has made arrangements with Trout & Sacket, 228 Lake street, Chicago, to carry a complete stock of all goods of his manufacture. Edward F. Ross will continue to act as Mr. Plumb's direct representative, and will carefully look after the territory assigned to him as heretofore.

THE NEW MAIL LINE of Bicycles manufactured by Wm. Read & Sons, 107 Washington street, Boston, will become better known in the West this year, as Albert W. Moore, late with Hibbard, Spencer, Bartlett & Co., will manage Wm. Read & Sons' Western branch. A full line of samples of these machines will be carried in Masonic Temple, Chicago.

STRANSKY & Co., New York, announce that they will on February 1 remove to 27 Murray street and 31 Warren street, the building running through the block.

QUACKENBUSH, TOWNSEND & Co., jobbers of Hardware, 85 Chambers street, New York, have for some time been desirous of disposing of their business, including, they say, a trade aggregating \$300,000 to \$400,000 per annum. Owing to a failure to find some one to take it on terms satisfactory to themselves, they announce they have decided to sell their stock on the best terms obtainable, their wish being to close it out by February 1, but not later

than May 1 in any event, when their present lease expires. This house was established in 1854, an emblem of their business being a large gilt padlock, which is still in their possession.

JOHN H. HEIMBUECHER, St. Louis agent for Cleveland Twist Drill Company, Cleveland, Ohio, issues a copy of the company's 1893 Calendar and Diary combined with his name attached as St. Louis agent. The Calendar is neat and attractive, and will no doubt be appreciated wherever received.

THE BRYDEN HORSE SHOE COMPANY of Catasauqua, Pa., have found the demand for their Boss shoes increasing so rapidly that they have been compelled to double their capacity. The new buildings are about completed and machinery, including engine and boilers and new train of rolls, will be in position in course of a few days.

JOHN H. GRAHAM & Co., 113 Chambers street, New York, have been appointed sole agents by the Bevin Bros. Mfg. Company, East Hampton, Conn., for the sale of their Bells. They advise us that they are prepared to quote factory prices, and for the convenience of the trade will carry a stock of the company's goods.

HOOPES & TOWNSEND, Philadelphia, are intending to enlarge their Nut, Bolt and Rivet Works. To this end they have purchased the site at present occupied by the Stuart-Peterson Company's plant. This lot measures 237 x 185 feet. The present plant of Hoopes & Townsend will be connected with the new acquisition by a bridge. Possession of this property will not, however, be obtained until April 1 next, as the Stuart-Peterson Company will not vacate it until that time, and nothing in the way of alteration will be done before then.

S. B. THOMFSON, Broken Bow, Neb., announces under date December 15 that he has bought all the interest of A. L. Davis in the former firm of Davis & Thompson, dealers in Hardware, Stoves, Tinware, &c.

LEEDS, ROBINSON & Co., general agents for the Standard Horse Shoe Company, 75 North street, Boston, issue a neatly printed circular in which they call attention to this brand of Horse Shoes. It is stated that these Shoes are made upon new and improved machinery, which it is claimed gives a more correct shape to the Shoe and a more uniform distribution of the material than has heretofore been the case. It is mentioned that great care is taken in the selection of the iron and the hammering and rolling into Shoe shapes, and that the creasing be the required width and depth to securely hold the nail; also in punching that the holes may have the correct angle for driving the nail. Every Shoe is inspected after leaving the hammers and again after being punched. They claim that the Shoe thus offered is equal if not superior to any now on the market. The Shoes are put up extra light in four sizes; light in nine sizes; medium in eight sizes; heavy in eight sizes, and light steel in five sizes.

THE W. J. KELLEY COMPANY, Greenville, Ohio, illustrate in their page advertisement in this issue their Kelley Adjustable Screen Door Frame, which we are advised has had a very gratifying sale throughout the country. These goods are handled by many of the leading jobbers, and the manufacturers are moving energetically with a view to still further increasing the demand for the Frames.

H. S. EARLE, Detroit, Mich., announces under date December 20 that on January 1, 1893, Geo. E. Scranton will be associated with him under the firm and style of Earle & Scranton. Mr. Scranton has been

connected with Standard Bros. for the past eight years, and having during that time called upon most of Mr. Earle's customers, it is stated that he needs no introduction to them. The lines of goods represented by Earle & Scranton have been enlarged and the circular gives a list of the manufacturers for whom they are agents, among them being a number of well-known concerns.

AMERICAN WHIP COMPANY, Westfield, Mass., in their page advertisement in this issue, give an illustration of their extensive plant, including the recent brick addition, 40 x 250 feet, built in the shape of a double L, two stories high. The large demand for their goods necessitated the erection of this addition, and the company now hope to fill orders more promptly than heretofore.

D. C. GILES advises us that a new company is being organized at Elmira, N. Y., for the manufacture of patented specialties and novelties. The concern will be an incorporated one, and work on the buildings will be commenced at once. Considerable machinery, both wood and iron working, will be required, as well as engine, boiler, shafting and small tools, and Mr. Giles will be pleased to receive circulars and catalogues from manufacturers.

THE VAN PATTEN MFG. COMPANY, Weedsport, N. Y., have been organized with a capital stock of \$10,000. The company will manufacture Carriage Hardware and will first place on the market a Foot Rail made from corrugated steel, rolled to special pattern, the corrugation being rolled in for the purpose of giving it great strength. The officers of the company are Robert S. Thompson, president and treasurer; I. E. Gutches, vice-president and secretary, and F. Van Patten, superintendent.

WRIGHT & HUTCHISON have bought out Mitchell, Moser & Co., Slate, Tin and Sheet Iron Roofing, Hardware, Stoves, &c., Warren, Ohio, and will carry on the business at the old stand. C. Wright of the new firm was formerly of the firm of Kane Bros. & Wright, Caldwell, Ohio. Mr. Wright was also at one time in the grocery business at Caldwell. L. G. Hutchison was formerly located in Morristown, Ohio.

OUR READERS will observe the announcement on another page in regard to Ealy's Blue Book, a reference book of credits for the Hardware, Iron, Metal, Machinery and kindred branches of trade, published by the John W. Ealy Company, 278 Broadway, N. Y. The Blue Book is published semi-annually, January 1 and July 1, the new book for the present year being in the hands of the binders. The publishers announce, it will be observed, that they will send a sample copy for inspection to any manufacturer or jobber.

ANNOUNCEMENT is made, January 3, that the firm of J. A. Van Winkle & Co., Paterson, N. J., has been dissolved by mutual consent. The business has been purchased by the J. A. Van Winkle Company, incorporated, who will continue it at the old stand. The capital stock of the new company is \$50,000. Its officers are: J. A. Van Winkle, president and treasurer; A. H. Zabriskie, vice-president and Edo Van Winkle, secretary.

J. R. BRIGHAM AND J. G. PARKER of the Swift Hardware Company, Corry, Pa., will open a Hardware store at Jamestown, N. Y., about February 1, 1893, under the firm name of Brigham, Parker & Co. They will carry a general line of Builders' Hardware, Factory Supplies, Iron and Steel, Stoves and House Furnishing Goods. The storeroom they will occupy is 25 x 80 feet, with basement and second floor. It will be fitted up with all modern

improvements, such as steam elevator, electric light and natural gas for heating, making it an especially well-arranged and complete Hardware establishment. The firm will be pleased to receive catalogues, price-lists and discount sheets from manufacturers during the month of January. We are advised that Messrs. Brigham and Parker have been connected with the Swift Hardware Company for 20 years, and both are referred to as men of experience and well known to the trade. Mr. Parker will have charge of the Jamestown store, Mr. Brigham remaining in charge of the store of the Swift Hardware Company, in Corry, which will be continued the same as heretofore without any change.

**READING HARDWARE COMPANY**, Reading, Pa., and 81 Reade street, New York, have been appointed agents for New York and vicinity for the Walling Shutter Bower, manufactured by the Walling Patent Shutter Bower Company, Frederick, Md.

SEVERAL WEEKS AGO, in referring to the fact that the American Bit Brace & Tool Company had succeeded the American Bit Brace Company we mentioned the address of the company as 122-126 Washington street, Boston. The latter part of this address was, however, erroneous, the company being located in Buffalo instead of Boston. As then stated, the newly organized company are only manufacturing those patterns of Braces and Tools which have after thorough tests proved entirely satisfactory, all others being abandoned.

FROM ALMON H. FOGG & CO., Houlton, Maine, we have received a neat calendar for 1893, the upper portion of which calls attention to the various lines of goods handled by them in connection with their Hardware business. The date sheet of each month is headed by an enumeration of goods suitable for that particular portion of the year. At the bottom of each sheet attention is called to some particular line of goods.

**HATCH CUTLERY COMPANY**, South Milwaukee, Wis., announce that they have appointed David Eastman, well known to the Cutlery trade, their New York agent, with salesroom and office at 97 Chambers street. They call attention to their extensive line of Shears, including solid steel and a full and complete line of Laid Shears as well. Their Shears are made with the Hatch patent bolt and washer, to the excellence of which reference is made. The company are also manufacturing Razors, Razor Straps, Tinniers' Snips and Pocket Cutlery.

**GILBERT & BENNETT MFG. COMPANY**, New York and Chicago, call the attention of the trade to the change which they have made in their Poultry Netting, from annealed wire to bright wire. It is remarked in a circular pertaining to this change that bright steel wire very much increases the strength, stiffness and evenness of the fabric, and affords a surface free from scale, to receive and retain the extra heavy pure zinc finish. All sizes will continue to be made with three long regular unwinding twists, standard mesh and full weight, length and width. Also Nos. 19 and 18 will have three-strand twisted selvages. Their circular No. 92 includes illustrations of Netting and revised price-list.

**THE RUSSELL & ERWIN MFG. COMPANY** illustrate in their double page advertisement in this issue some of their more recent designs in Embossed Bronze Metal Door Knobs, together with a new Renaissance design in bronze metal. The Sliding-Door Lock will be appreciated, as it has for a recommendation, in addition to its adaptability for these doors, the same merits of lightness, combined with strength

and uniformity of measurement, as the company's entire line of Wrought-Steel Door Locks. The Lock is shown complete with one of their new embossed Escutcheons.

**TROUT & SACKET**, 228 Lake street, Chicago, Ill., have opened a house in that city for the introduction of the special lines which they affect. They will make a specialty of goods manufactured by the Wire Goods Company of Worcester, Mass., including their Steel Door Mats, Wire Coat and Hat Hooks, &c., and will carry a full and complete stock, and be ready to take care of the wants of the trade after January 5.

**GEORGE A. GRAHAM** was admitted as a partner in the firm of John H. Graham & Co., 118 Chambers street, New York, on December 31. Mr. Graham is a son of the senior member of the house. He has been identified with the business for the past six or seven years. The firm now consists of John H. Graham and his two sons, Wm. A. and George A. Graham.

**COOPER & MCKEE**, 119 Gwinnett street, Brooklyn, N. Y., issue a neatly engraved folder in which the compliments of the season are extended to their customers. It illustrates one or two winter scenes, and calls attention also to their New Columbia Refrigerators.

WE ARE ADVISED by the Biddle Hardware Company, Philadelphia, that Andrew W. Eastwick and James D. Green have severed their connection with that firm, and that the buying department will hereafter be under the personal charge of Charles M. Biddle. Mr. Green, who has been connected with the company for over 20 years, and been their buyer for a considerable period, has associated himself with the Supplee Hardware Company of the same city. Mr. Green is well acquainted with the leading manufacturers and commercial travelers, is very favorably known and is considered a close, conservative buyer. This change will doubtless be a surprise to many of his friends in the trade.

**MABBETT, HENDRY & CO.**, dealers in general merchandise, Quitman, Ga., have opened a Hardware store, which they will conduct in connection with their present business. It will be under the charge of C. H. Troutman, who has been identified with the Hardware establishment of John Tillman of Quitman for about ten years.

**KING HARDWARE COMPANY** are a recently organized concern at Bristol, Tenn. They commenced business on October 1.

**HIBBARD, SPENCER, BARLETT & CO.**, Chicago, send a hanger, entitled "A Trip to the World's Columbian Exposition." Sixteen of the buildings of the exposition are shown in colors, and are numbered, indicating the order of the buildings in a tour of the grounds from the main entrance, at Fifty-ninth street. Near the top of the hanger is a larger view, showing the block of buildings used for the business of the above company. At the lower end are attached calendar sheets for 1893. The idea is a pleasing one, and will give their customers an excellent idea of the magnitude of the firm's business, and also of the coming exposition.

**FOREHAND ARMS COMPANY**, Worcester, Mass., send us catalogue describing and illustrating their new Hammerless Double Gun, Breech-Loading Shot Gun, Hammerless Single-Barrel Gun, New Model, New Hammerless and Double-Action Revolvers. In this Gun the locks are rebounding and the barrels can be taken off and put on again without cocking the arm, and when cocked the hammers can be let down gradually and without the full force of the b'ow.

## The Chicago Nail Trade in 1892.

THE VOLUME of business in 1892 was in excess of that of any former year, but prices were deplorably low. The average for the year is considerably under that for any previous year. Fluctuations in Cut Steel Nails were remarkably narrow, while Wire Nails experienced comparatively numerous and important changes. Although the aggregate quantity of Nails handled easily surpassed that of any previous year, Cut Nails continued to decline in favor and Wire Nails to gain. There are now very few Cut Nail factories supplying the Chicago market, the bulk of the trade being enjoyed by a local company, with only occasional sales by distant concerns. On the other hand, competition grows stronger in the line of Wire Nails, as they absorb a still greater part of the Nail trade. Several new factories made their influence felt in 1892 for the first time, some of them being located so close to Chicago that they were able to offer special advantages to jobbers, thus compelling more distant works to reduce prices in order to get their share of orders. The course of prices during 1892 as compared with 1891 is shown in the following table of monthly averages on both Cut and Wire Nails, factory shipments, f.o.b. Chicago:

Months.	1892.		1891.	
	Cut Steel.	Wire.	Cut Steel.	Wire.
January.....	\$1.62½	\$1.82½	\$1.75	\$2.25½
February.....	1.62½	1.87½	1.75	2.27½
March.....	1.62½	1.85	1.80	2.22½
April.....	1.60	1.75	1.75	2.12½
May.....	1.60	1.70	1.70	2.05
June.....	1.62½	1.97½	1.70	2.02½
July.....	1.60	1.70	1.65	2.07½
August.....	1.62½	1.70	1.70	2.02½
September.....	1.62½	1.67½	1.70	2.00
October.....	1.62½	1.57½	1.65	1.90
November.....	1.60	1.60	1.65	1.85
December.....	1.60	1.57½	1.65	1.80
Average for year..	\$1.61	\$1.70	\$1.70½	\$2.05

Very heavy sales were made in January, and manufacturers had strong expectations of much higher prices. Wire Nails were in particularly good demand, and many merchants were known to have bought speculatively in the belief that values were advancing. Cut Nails merely held their own, but Wire Nail manufacturers were able, by concerted action in February, to make an advance which was fairly maintained through March. In that month, however, the fact became apparent that jobbers' stocks were in excess of the demand, and they reduced their prices to the level of manufacturers' rates and controlled the trade. A new Wire Nail card was adopted in April, making advances in extras on large sizes and reductions on small sizes, but any advantage to be realized was lost by an immediate reduction in the base price. Manufacturers found themselves obliged to reach out for retailers' trade in May, and the market soon became greatly demoralized. Wire Nail prices dropped to such a point that jobbers again found it advantageous

to lay in large stocks, making purchases as low as \$1.50, Chicago, the lowest of the year. June trade was almost wholly in the hands of the large jobbers, as might have been expected. Cut Nails this month were a little stronger, as factories began to shut down to settle the wages scale for another year. July found a more active trade, with Wire Nails higher but Cut Nails kept at old rates, through the conservatism of the manufacturers with large stocks. In August the general trade was again active, with heavy sales of Cut and Wire. The Muncie Nail Works were burned this month and an active competitor for Chicago trade was thus withdrawn. September was a fairly good month. Large sizes of Cut Nails were very scarce, but prices were not advanced except in occasional instances. The Wire Nail market was affected by low freight rates to the Northwest by lake transportation lines from Ohio factories, and toward the close of the month distant Cut Nail factories made raids on the local trade. The Wire Nail market, in October, felt the influence of dearer Rods and prospects of an advance were bright. November witnessed an active trade in all kinds of Nails, but at the close prices again drooped in consequence of a decline in Rods and active competition among makers. The demand was light in December and concessions were made by makers, the year closing without sensational features of any kind.

### The Barb Wire Trade in 1892.

**A**T THE BEGINNING of 1892 the Barb Wire trade of the country appeared to be under the control of the Columbia Wire Company. If matters had thus continued, our annual review of the trade would merely have been a reproduction of the price schedules of that company. They were, however, not able to bring all manufacturers into line, and outside competition grew so annoying to at least part of the membership that in spite of heavy business and fairly remunerative prices the managers decided that on February 1 the arrangement should cease and all the manufacturers interested would be free to sell as they pleased. An immediate fall in prices occurred, although not so great as had been expected, the demand being too heavy. The cheapness of Barb Wire told on the demand for Painted, however, as the trade manifested a decided preference for Galvanized, which now became as low as Painted had not long before been selling at. March, April and May were months of continued heavy business, manufacturers being for the most of that time considerably behind in deliveries. The season's shipments were far in excess of those of any previous spring, yet prices continued to decline steadily. June and July were very dull months. August was a trifle better, and September gave some little promise of good fall business, but it did not materialize, and in October the admission was freely made by manufacturers that the fall had been a severe disap-

pointment. The L. L. Elwood Mfg. Company issued a circular considerably reducing prices on Glidden Wire and causing much comment in the trade by the withdrawal of the usual guarantee on unsold stock against a lower price. Manufacturers now deplored the disruption of the Columbia Wire Company's sales agency, and some effort was made to again get matters under control, as the business was declared to be absolutely profitless. In November the advance in Rods was grasped as a good basis for advancing prices, and a meeting was held in Chicago for that purpose, but nothing was accomplished either then or in subsequent efforts in the same direction. Painted Wire sold down to 2 cents at Joliet for shipment during the early months of 1893. On December 1 announcement was made of the union of five large companies under the name of the Consolidated Steel & Wire Company. In the first week in December the Joliet Enterprise Company failed. The year ended with a decided improvement in the demand and prices manifesting an upward tendency. The course of prices is shown in the following table, which gives monthly averages for factory shipments from works in the vicinity of Chicago on Painted Barb Wire:

Months.	1892. Cents.	1891. Cents.	1890. Cents.
January.....	2.60	2.70	3.25
February.....	2.45	2.70	3.35
March.....	2.40	2.85	3.30
April.....	2.30	2.85	3.15
May.....	2.30	2.82 $\frac{1}{4}$	2.90
June.....	2.30	2.75	2.85
July.....	2.30	2.70	2.85
August.....	2.20	2.77 $\frac{1}{4}$	2.85
September.....	2.20	2.80	2.85
October.....	2.15	2.55	2.85
November.....	2.15	2.55	2.75
December.....	2.10	2.55	2.70
Average for year.....	2.29	2.72	2.97

### Calendars.

**W**M. CABBLE WIRE MFG. COMPANY, 43 Fulton street, New York, issue large calendar sheets for 1893, one month to a sheet, held at the top by a metallic strip. The dates are large enough to be seen across an office, and their line of goods represented above the figures. Their goods are enumerated in black, on tinted backgrounds of various shades, and are as follows: Copper, Brass and Iron Wire, Wire Cloth, Cylinder Molds, Foundry Wires, &c.

**T**HE NATIONAL HORSE-NAIL COMPANY, Vergennelai, Vt., manufacturers of the Champlain Horse Nails, send a Metallic End Hanger Calendar for 1893, with a large colored center piece representing Columbus' triumphant return to Spain in 1493. On each side of this picture are cards bearing the dates of the months. Near the top of the Hanger are illustrations of their Horse Nails, forged hot and cold finished. There is also a representation of one of the boxes their nails are packed in.

**T**HE BRYDEN HORSE SHOE COMPANY, Catasauqua, Pa., are sending out gilt-edged pocket memorandum books, bound in leather and ivory imitation celluloid. The trade-mark—the Boss and a clover leaf encircled by a shoe—appears on the front cover, while an 1893 calendar is printed on the back cover. Inside the front cover and on the first page are descriptions of their Iron and Steel Boss Horseshoes. On the inside of the back cover is an 1894 calendar.

C. E. LE MASSENA & CO., Newark, N. J., manufacturers of Solid Leather, Sheepskin and Paper Wheels, send, with their compliments, a neat calendar card, with date sheets attached. At the left, on the center of the card, is a street scene with lady in antique dress. To the right of this is the company's card.

### Price-Lists, Circulars, &c.

**T**HE ST. JOSEPH PUMP COMPANY, St. Joseph, Mo.: The Perfection Water Elevator and Purifying Pumps. In their catalogue No. 5, 1893, descriptions and illustrations of the Pumps are given, also reasons why dealers should handle the Perfection Pump. The aim in presenting the catalogue is not only to acquaint the trade with this style of pump, but to present to the public the facts showing the necessity of using pure water and how to obtain it.

E. C. MEACHAM ARMS COMPANY, St. Louis, Mo.: Catalogue No. 524, to dealers only. Illustrations are shown of Guns, Rifles, loaded Shells, Traps, Hunting Coats, Gun Implements, Bicycles, Roller Skates, Tents, Foot-Ball Goods, Cartridges, Revolvers, &c.

### Exports.

**T**HE FOLLOWING are the exports of Hardware, Machinery, Metals and related goods from the port of New York to foreign countries for the week ended December 24, 1892. The items for Canada and Mexico include merchandise by sea-going vessels only. The totals following each port or country represent the value of all exports except specie:

ANTWERP.—Total, \$411,497.

Hardware.....	\$795	Manufd Iron....	\$340
Organ.....	66	Electric Material.	3,008
Sewing Machines.	393	Machinery.....	266

ABERDEEN.—Total, \$13,701.

AMSTERDAM.—Total, \$64,554.

ADEN.—Total, \$40,806.

AZORES.—Total, \$3,794.

Hardware.....	\$24	Agricult. Impls..	\$8
Pumps.....	85	Lamp Goods....	20
Clocks.....	150		

ABERDOVEY.—Total, \$100.

ARGENTINE REPUBLIC—Total, \$72,465.

Hardware.....	\$1,060	Agricult. Impls.	\$6,353
Manufd Iron....	1,023	Lamp Goods....	1,900
Wagon.....	70	Sewing Machines.	39
Electric Material.	1,500	Nails....	1,350
Manufd Wood...	125	Machinery.....	6,100
Sandpaper.....	180	Clocks....	2,920
Washers.....	155	Pumps.....	200

AUSTRALIA.—Total, \$7,219.

Hardware.....	\$1,730	Manufd Wood...	\$23
Firearms.....	280		

BEYROUTH.—Total, \$ 30.

BRADFORD.—Total, \$1,846.

BERLIN.—Total, \$2,085.

Typewriters.....	\$681	Woodware.....	\$150
Surgical Insts... to	10	Machinery.....	1,129

BRISTOL.—Total, \$142,347.

Manufd Wood...	\$855	Hardware....	\$420
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BORDEAUX.—Total, \$7,306.

Agricult. Impls.....			\$524
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BARCELONA.—Total, \$11,536.

BRITISH GULANA.—Total, \$45,717.

Twine.....	\$7	Lamp Goods....	\$16
Organettes.....	3430	Car Wheels....	\$157
Phonographs....	300	Clocks....	1,404
Lamp Goods....	1,530	Carriages....	180
Organs.....	294	Plated Ware....	68
Hardware.....	116	Refrigerators....	72
Bird Cages.....	46		

BOLIVIA.—Total, \$812.

Hardware.....	\$98	Carriage Material	\$14
Carriages.....	400		

BREMEN.—Total, \$120,165.

Sandpaper.....	\$792	Carriage.....	\$250
Agricult. Impls....	107	Pumps.....	900
Cash Registers...	300	Machinery.....	800
Metal Goods....	200	Hardware....	2,898
Plated Ware....	119	Physical Appli- ances....	700
Woodware....	6	Manufd Iron....	30
Emery Wheels....	175		
Boiler Comp.....	92		

BRITISH WEST INDIES.—Total, \$409,614.	
Hardware.....	\$864
Manufd Iron....	388
Agricuit. Impmts.	84
Nails.....	91
Caps.....	69
Carts.....	153
Carriage.....	345
Twine.....	22
Pulleys.....	13
Brushes.....	12
Axes.....	12
Pumps.....	440
Sandpaper.....	30
Pitchers.....	20
Machinery.....	1,171
Refrigerators....	29
Plated Ware....	35
Manufd Wood....	38
Lamp Goods.....	362
BELFAST.—Total, \$2,917.	
Sewing Machines.	\$350
BRAZIL.—Total, \$10,028.	
Hardware.....	\$155
Cutlery.....	44
Twine.....	31
BRITISH POSSESSIONS IN AFRICA.—Total, \$6,207.	
Rubber Goods....	\$25
Machinery.....	4,778
Carriage Material	26
BREMERHAVEN.—Total, \$228	
Wringers.....	84
BILBOA.	
Pumps.....	176
BRUSSELS.—Total, \$2,024.	
Rubber Goods....	\$1,060
Agricuit. Impmts.	395
CHILL.—Total, \$73,344.	
Clocks.....	\$1,213
Sewing Machines.	556
Shoe Nails....	182
Agricuit. Impmts.	2,800
Washing Machines	110
Trunks.....	281
Rubber Goods....	220
Plated Ware....	1,874
Tinware.....	96
Tacks.....	15
Manufd Iron....	6,091
Scales.....	15
Manufd Wood....	23
Sandpaper.....	75
CANADA.—Total, \$37,108.	
Bristles.....	\$972
CUBA.—Total, \$428,697.	
Hardware.....	\$6,413
Manufd. Wood.	1,453
Lamp Goods....	1,518
Nails.....	257
Cart.....	75
Packing.....	1,074
Nails.....	1,524
Grindstones....	196
Pumps.....	1,959
Spikes.....	210
Valves.....	35
Railroad cars....	2,750
Wheels.....	329
Lubricators....	48
Car Material	3,207
Wheels and Ax- les.....	310
Plantation cars..	1,083
Sandpaper.....	63
Velocipede.....	50
Windmill.....	30
Iron.....	70
Cars.....	50
Carriage Material	110
Roofing Material	113
Fuse.....	19
Clocks.....	85
Wringers.....	35
Wrecking.....	5,000
Manufd Iron....	14,368
Brass Goods....	150
Steel Wire.....	262
CENTRAL AMERICA.—Total, \$11,513.	
Manufd Wood...	\$53
Lamp Goods....	52
Plated Ware....	465
Rubber Goods....	170
Wheelbarrows...	108
Electric Material	117
Mag. metal....	53
CASSEL.	
Manufactured Wood	\$141
CHRISTIANIA.—Total, \$2,903.	
CHEMNITZ.—Total, \$485.	
Machinery.....	\$457
CADIZ.—Total, \$494.	
CORK.—Total, \$638.	
COPENHAGEN.—Total, \$87,508.	
Hardware.....	\$156
Clocks.....	126
CHINA.—Total, \$50,470.	
Electric Material.....	\$246
CONSTANTINOPLE.—Total, \$322.	
CHRISTIANSAND.—Total, \$500.	
DUNKIRK.—Total, \$28,500.	
DARMSTADT.	
Sandpaper.....	\$238
DUUNDEE.—Total, \$180.	
Clocks.....	.....
DUBLIN.—Total, \$373.	
DANTZIC.—Total, \$3,080.	
DRESDEN.—Total, \$60.	
DUSSELDORF.—Total, \$166.	
DEPTFORD.—Total, \$77,000.	
DANISH WEST INDIES.—Total, \$5,000.	
Manufd Iron....	\$251
Grindstones....	45
DUTCH WEST INDIES.—Total, \$14,189.	
Manufd Wood...	\$90
Plated Ware....	85
Machinery.....	61
Compass.....	24
Manufd Copper....	26
Rubber Goods....	53
Bicycle.....	49
Sandpaper.....	14
DUTCH EAST INDIES.—Total, \$511.	
Firearms.....	.....
ECUADOR.—Total, \$2,373.	
Hardware.....	\$9
Wheelbarrows....	45
Cutlery.....	1,064
FRENCH WEST INDIES.—Total, \$72,490.	
Carriage Material	\$195
Lamp Goods....	100
Hardware.....	7
Twine.....	10
Woodware.....	16
Plated Ware....	18
Tinware.....	51
FRENCH POSSESSIONS IN AFRICA.—Total, \$11,035.	
FIUME.—Total, \$320.	
FRANKFORT.—Total, \$320.	
Aluminum.....	.....
FLORENCE.—Total, \$779.	
GIBRALTAR.—Total, \$8,675.	
GLASGOW.—Total, \$347,147.	
Machinery.....	828
Lead.....	4,800
Agricuit. Impmts.	625
Saws.....	134
Clocks.....	760
GOTTENBURG.—Total, \$3,060.	
Crucibles.....	.....
GENOA.—Total, \$233,165.	
Agricuit. Impmts.	\$30
Woodware.....	30
Firearms.....	15
Whetstones....	260
Clocks.....	134
HELSINGFORS.	
Typewriters.....	.....
HONG KONG.—Total, \$71,014.	
Sewing Machines.	\$980
Firearms.....	910
JAPAN.—Total, \$28,292.	
Clocks.....	\$12,642
India Rubber....	325
JEDDAH.	
Lamp Goods.....	.....
HAYTI.—Total, \$36,714.	
Hardware.....	\$89
Manufd Iron....	280
Machinery.....	25
Nails.....	25
HULL.—Total, \$252,269.	
Manufd Iron....	\$100
Machinery.....	2,120
Manufd Wood....	305
Packing.....	100
Carriage Matl....	500
HAMBURG.—Total, \$359,319.	
Machinery.....	\$80
Organs.....	1,250
Manufd Iron....	280
Machinery.....	25
Nails.....	25
HAVRE.—Total, \$280,147.	
Machinery.....	\$3,278
Hardware.....	559
Typewriters....	5,884
Vul. Fiber....	1,419
Lamp Goods....	98
Manufd Wood....	12
Machinery.....	1,111
Razor Strops....	14
Whetstones....	48
Saws.....	76
Fish Lines....	10
Electrical Matl....	6,653
India Rubber....	1,970
LIBAU.—Total, \$1,374.	
LA PALLICE.—Total, \$11,800.	
LEGHORN.—Total, \$38,198.	
LEEDS.	
Clocks.....	.....
LEIPSIC.—Total, \$170.	
Manufd Wood...	\$20
Whetstones....	18
Agricuit. Impmts.	649
LIMERICK.—Total, \$65.	
LISBON.—Total, \$88,091.	
Pumps.....	\$75
Firearms.....	20
LONDON.—Total, \$788,404.	
Machinery ..	\$13,933
Windmills....	700
Whetstones....	60
Woodware.....	463
Firearms.....	16
Lead.....	27,205
Rubber Goods....	100
Electrical Matl....	190
Typewriters....	9,285
Organ.....	500
Cash Registers....	600
India Rubber....	9,630
Grindstones....	21
Manufd Wood...	12,682
LIVERPOOL.—Total, \$1,253,999.	
Rubber Goods....	\$270
Manufd Iron....	3676
Plated Ware....	30
Cutlery.....	100
Machinery.....	7,542
Firearms.....	902
Lamp Goods....	125
Woodware.....	890
Oxide Zinc.....	476
Scales.....	15
India Rubber....	250
Firearms.....	154
Copper Matte....	42,000
Typewriters....	2,067
Electrical Matl....	40
Musical Goods....	27
Saws.....	446
Cash Registers....	100
Hardware.....	4,986
Clocks.....	4,469
Manufd Wood....	4,325
LEICESTER.	
Sandpaper.....	.....
LAUSANNE.—Total, \$1,515.	
LEEDS.—Total, \$12.	
MIQUELON.—Total, \$987.	
Sewing Machines.....	.....
MILAN.—Total, \$684.	
Sewing Machines.....	.....
MALTA.—Total, \$410.	
MARSEILLES.—Total, \$220,847.	
Organs.....	\$250
Agricuit. Impmts.	336
MOSCOW.	
Scales.....	.....
MALMO.	
Organ Material.....	.....
MEXICO.—Total, \$20,875.	
Hardware.....	\$443
Manufd Wood....	30
Cartridges....	50
Cutlery.....	1,978
Manufd Steel....	635
Locomotive Matl.	110
Roofting Matl....	45
Car Wheels....	38
Cartridge Shells....	400
Shot.....	114
Manufd Iron....	673
NOVA SCOTIA.—Total, \$12,069.	
Hardware.....	\$40
Tinware.....	.....
Twine.....	20
Brass Goods....	4
Pumps.....	98
Carbon.....	150
NEWFOUNDLAND.—Total, \$7,079.	
Roofing Material....	\$885
Lamp Goods....	51
Firearms.....	24
Manufd Iron....	454
Typewriters....	30
Sewing Machines.	171
Hardware.....	51
Ituber Goods....	94
NEW BRUNSWICK.—Total, \$5,211.	
Coal.....	.....
NANTES.—Total, \$2,254.	
NEW ZEALAND.—Total, \$6,208.	
Agricuit. Impmts.	\$20
Manufd Iron....	524
Clocks....	280
Machinery.....	75
NAPLES.—Total, \$8,224.	
Agricultural Implements.....	.....
NEWCASTLE.—Total, \$48,714.	
Hardware.....	\$300
Skewers.....	425
Manufd Wood....	455
Woodware.....	550

OPORTO.—Total, \$73,735.			
Clocks	\$286	Firearms	\$85
Manufd Wood	180	Woodware	100
Manufd Iron	263	Hardware	102
ODESSA.—Total, \$2,074.			
Agricult. Impmts.	\$1,845	Hardware	\$229
PORTO RICO.—Total, \$2,178.			
PALERMO.—Total, \$91,405.			
PORTUGUESE POSSESSIONS IN AFRICA.—Total, \$202.			
Manufactured Iron	.....	\$35	
PERU.—Total, \$3,867.			
Lathe Stones	\$12	Hardware	\$90
Rubber Goods	22	Tacks	27
Brass Tubes	39	Brushes	11
Electric Material	207	Firearms	368
Cartridge Shells	61	Cartridges	176
Typewriters	176	Woodware	21
Sewing Machines	671	Manufd Wood	33
PIRÆUS.—Total, \$25.			
PLYMOUTH.—Total, \$950.			
ROTTERDAM.—Total, \$277,901.			
Pins	\$300	Machinery	\$800
Tinware	130	Rubber Goods	3,860
India Rubber	400	Steel	319
ROME.—Total, \$500.			
ST. PETERSBURG.			
Machinery	.....	\$130	
ST. ANDREWS (SCOT.)			
Machinery	.....	\$650	
SMYRNA.—Total, \$2,300.			
Pumps	.....	\$356	
SPANISH POSSESSIONS IN AFRICA.—Total, \$33,794			
Agricult. Impmts.	\$146	Hardware	\$17
Plated Ware	15	Rubber Goods	6
Scales	304	Twine	60
Woodware	16	Manufd Iron	501
Clocks	398		
STUTTGART.—Total, \$1,587.			
Valves	.....	\$1,521	
STRASBURG.—Total, \$69.			
STOCKHOLM.—Total, \$3,828.			
SANTANDER.—Total, \$113,082.			
Sewing Machines	.....	\$7	
STETTIN.—Total, \$110,131.			
Agricult. Impmts.	\$1,229	Sandpaper	.....
SIAM.—Total, \$415.			
Organ	.....	\$25	
TRIESTE.—Total, \$45,554.			
Firearms	.....	972	
TRIPOLI.			
Organ	.....	\$75	
TASMANIA.—Total, \$1,582.			
URUGUAY.—Total, \$11,838.			
Machinery	.....	\$261	
UNITED STATES OF COLOMBIA.—Total, \$8,657.			
Silverware	\$18	Manufd Iron	9733
Cutlery	2,207	Lamp Goods	40
Scales	6	Agricult. Impmts.	33
Trunks	30	Machinery	140
Watches	975	Carriage Material	44
Hardware	113	Copper	54
VERONA.			
Machinery	.....	\$287	
VIENNA.—Total, \$684.			
VENEZUELA.—Total, \$123,137.			
Manufd Iron	\$1,063	Carts	\$235
Machinery	1,983	Hardware	1,797
Scales	140	Lamp Goods	189
Nails	56	Sewing Machines	1,550
Sandpaper	88	Electrical Goods	288
Tinware	24	Agricult. Impmts.	107
Needles	104	Cutlery	606
Brushes	60	Woodware	148
Clocks	173	Sheet Copper	266
Cartridges	733	Piping	85
Axes	46	Tacks	11
Refrigerators	15	Rubber Goods	468
Iron	36	Manufd Copper	40
Saws	127	Surveying Insts.	73
Valves	3	Twine	398
Iron Pipe	324	Iron Safe	508
Firearms	1,750	Water Coolers	18
Pumps	1,119	Carriage Vatl	8
Compasses	62	Wire Goods	42
Mimeograph	18	Holystones	14
Saw Bits	104	Packing	31
Coal	520	Chandeliers	116
Cable Reel	940	Plated Ware	15
Wheelbarrows	68	Saw Teeth	70
Nails	6		
WARSAW.			
Scales	.....	\$480	
ZURICH.—Total, \$868.			
Rubber Goods	\$189	Velocipedes	.....
Grand total			
		\$7,235,354	

## Paints and Colors.

*It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.*

Winding up the affairs of the old year and getting the machinery of trade in readiness for a fresh campaign has been the chief occupation of manufacturers and other handlers of Paints and Colors during the past week. One of the most interesting events in this connection was an announcement, at the last moment of a reduction  $\frac{1}{4}$ ¢ lb in prices of White Lead, Red Lead and Litharge by the National Lead Company. In other lines no important changes have taken place, and the year opens with trade conditions generally favorable, not only for steadiness to values of the more staple articles, but for a good volume of business as the spring season advances. It is pointed out that values in nearly all departments are on a low level, that jobbers' and large retailers' stocks have been permitted to taper down to small proportions, and that there are no signs at present of obstacles arising to interfere with building operations.

*White Lead*—All brands controlled by the National Lead Company, otherwise known as the Lead Trust, have been reduced in prices, as follows, the quotations being the same for Dry Lead and Lead in Oil:

In kegs, lots of 12 tons and over	6½¢
" " 5 " to 12 tons	6¾¢
" " 500 lbs. " 5 "	6¾¢
" " lots of less than 500 lbs	7¼¢

In 25 lb. tin pails, oil, add to keg price...

" 12½¢	
" 1 to 5 lb assorted tins	2½¢

Cash discounts and general terms of sale remain as heretofore.

As yet there has not been sufficient time to afford any idea of the effect of the reduction upon the general market, and, as far as can be learned, corroders who usually work harmoniously with the National Co. will continue to do so. No changes on the cheaper varieties of pigment are reported but in the natural order of things.

*Red Lead and Litharge*.—The new list prices for these products in kegs is the same as that quoted for White Lead, while for barrels and half barrels the quotations are  $\frac{1}{2}$  cent less. Any or all of the three lines may be purchased in making up the quantity to which the list prices apply. During the past week business has been of moderate volume, not only in the fine grades but in the cheaper class of product used by glass-makers, but it is expected that the revised prices will prompt freer purchases ere long.

*Zincs*.—American Oxide, in common with nearly everything in the Paint line, has met with limited sale. Orders placed with manufacturers were not on a parity with those given during the preceding week and jobbers have been favored with merely retail sort of demand. There is no sign of special anxiety for new business at the moment, however, most producers being comfortably situated, and the former range of prices prevails. There is no change whatever in foreign brands, business being slow and prices and terms the same as for some considerable time past.

*Colors*.—No changes are quoted on the more staple lines of Dry or Oil Colors, and the revision of lists on specialties in the latter line have been few thus far and unimportant. Bulk goods used by grinders have also been free from price fluctuation deserving of special mention. In ready-mixed Paints there has likewise been an absence of important change. Business throughout has been on a very moderate scale, as usual at this season of the year.

*Miscellaneous*.—The position of the market for block Chalk has undergone no

change, and prices are momentarily nominal in a great degree. Whiting, Paris White and Putty are similarly situated, the outlet at present being narrow. Barytes, Terra Alba, Talc, &c., are quoted as heretofore and find slow sale.

## Oils and Turpentine.

The situation in the various branches of the Oil market remains practically unchanged. There has been a slight reaction in prices of Cotton Seed Oils from the extreme high point to which they were forced by late speculative operations, but, this aside, firmness has figured as a conspicuous feature of the market for all the more staple lines of goods. Unless all signs are very much at fault, there is little chance of any downward movement in lubricants unless the cost of Lard and inferior greases depreciates greatly. Business has not been brisk in any line, yet manufacturers and jobbers report a remarkably good movement for this season, despite the comparatively high prices ruling in most departments.

*Linseed Oil*.—Some city crushers report having booked very fair orders for Raw Oil for near future delivery, and, in certain instances, the remarks in connection therewith suggest that a few large buyers have purchased early in expectation of prices being advanced when the spring season demand sets in. Otherwise it does not appear that business has contrasted with the usual run during the holiday period. There is no sign of pressure of "outside" brands for sale in this locality or offerings of any large volume from second hands. Values therefore remain firm, with the line of quotations the same as it was a week ago.

*Cotton Seed Oils*.—Speculative demand has relaxed, and in its place has appeared surface indications of more anxiety to sell on the part of some large handlers of the goods; that is to say, the offering of both crude and refined product has been freer, while the would-be sellers lowered prices 2¢ @ 3¢ from the highest point of the season without disposing of any considerable quantity of Oil. It is claimed that speculative manoeuvring, rather than legitimate market conditions, is responsible for the decline, and that the offering here is at prices relatively lower than have been paid during the week at primary sources of supply. In this (New York) market the decline has been from 47¢ to 43¢ for crude, and from 49¢ to 46¢ for Prime Summer Yellow.

*Lard Oil*.—With further additions to the cost of raw material, pressers are gradually stiffening up on their prices for Oil and it is not beyond the bounds of probability that prime winter Oil will ere long command 90¢ a gallon in wholesale quantities if the price of Lard is kept at its present height. As a matter of fact some pressers are even now asking 90¢ for single-barrel lots and not under 87¢ is quoted on either city or out-of-town brands in wholesale lots. Consumption is checked more or less by the high prices ruling and the volume of business, with due allowance for the season, is below the average.

*Miscellaneous*.—Crude and refined Sperm Oils are very firmly held with prices a shade higher for the latter in some instances. Whale and Menhaden products are quite as strong, although not quoted higher. At present the volume of business is moderate, but inquiries in the market point to a freer movement ere long. Cocoanut Oils have been sold at slightly lower prices, but not to any great extent. Olive and Palm Oils moving in a routine way at about former rates.

*Spirits Turpentine*.—Dealing have been of a routine character and moderate, all told. The demand has also run light, and, in the absence of offsetting feature, prices ruled a shade lower, receding to 30½¢ for regular and 31¢ for machine barrels.

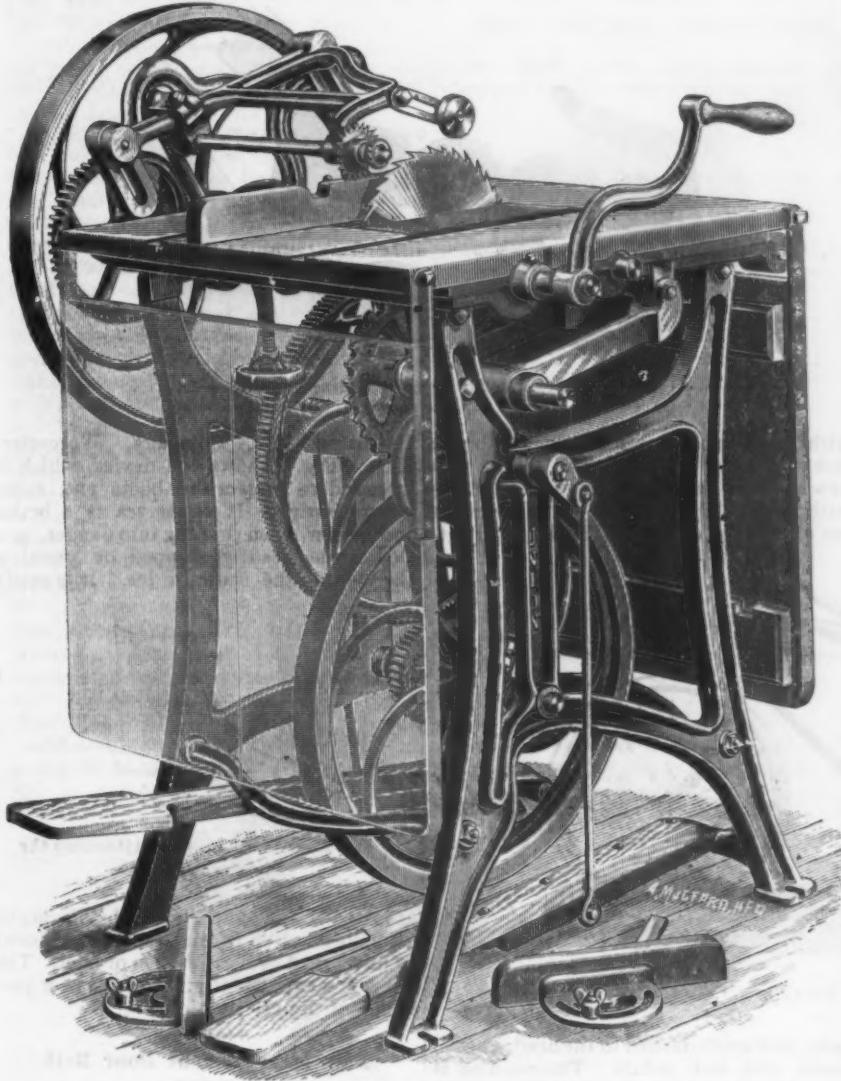
**Union Combination Saw.**

A combination circular sawing machine with self-feed ripping device and intended to be used in connection with foot, hand or steam power is illustrated herewith. It is made of iron and steel with the exception of the hardwood strips in the center of the table, on the face of

weight of the machine is given as 420 pounds and boxed for shipment 550 pounds.

**First Choice and New Idea Lawn Mowers.**

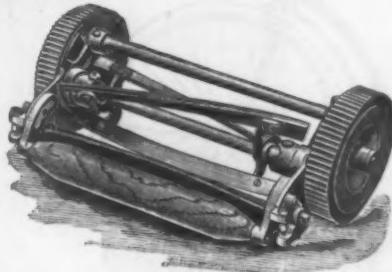
Farmer's Friend Mfg. Company, Dayton, Ohio, for whom Surplus, Dunn & Alder, 97 Chambers street, New York, are agents,



*Union Combination Saw.*

the gauges, the top of the treadles and the drop leaves. The power is transmitted entirely by gears in a chain belt, all gears being cut by automatic machinery. The foot power has a walking motion and enables the operator to run the machine with both feet sitting or one foot standing, as may be desired. The iron table is planed true and in the center are fitted two adjustable hardwood strips. The table is also provided with two adjustable sliding cutting-off or miter gauges and one ripping gauge having steel slides, which properly fit the grooves in the table, thus securing accuracy in their adjustments. The table is hinged at the back and can be adjusted up or down for grooving, rabbeting, &c., by the hand screw shown at the front. For ripping long stuff the machine is provided with drop leaves, which may be raised, thus making a long table. The self-feed ripping device has an adjustable feed for ripping which is self-adjusting for all ordinary work and positive in its action. The feed also has three changes of speed. It is stated by the Seneca Falls Mfg. Company of Seneca Falls, N. Y., who make the machine, that with it one man can easily rip soft wood up to  $3\frac{1}{2}$  inches and hard wood up to 2 inches thick. The

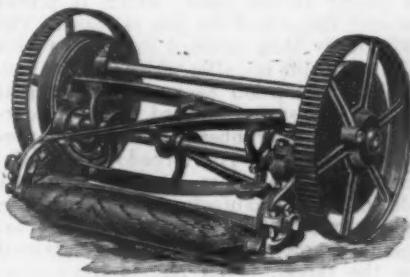
are putting on the market for the coming season a line of improved lawn mowers, both low and high wheel, as shown in the accompanying illustrations. The special feature in the machines is the double acting adjusting screw for the knife, there being one on each end of the cutter bar. This



*Fig. 1.—First Choice Lawn Mower.*

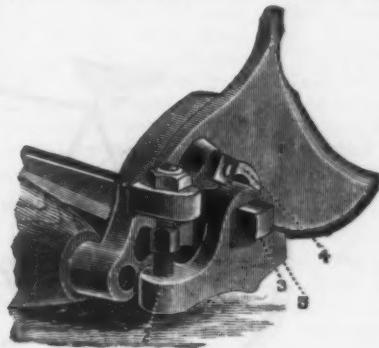
screw is threaded both above and below, and it is stated that a slight turn puts the knife where it belongs and holds it there. The adjustment can be done quickly with the mower on the ground. It is also stated that the steel reel shaft is turned

and fitted in adjusted reel boxes so arranged that all wear can be taken up. What is referred to as a new idea in the high wheel machine, from which it takes its name, is the spring grip which it is claimed produces instant action and is



*Fig. 2.—New Idea Lawn Mower.*

perfectly noiseless. With this device, when the machine stops the grip is instantly released and the reel stops, thus preventing unnecessary wear of the reel box. The brace shaft on both machines is set very high so that the grass may not be bent over before the reel draws it into the wiper. The manufacturers also mention that with these machines the grass cannot get into the gearing and that the handle is so attached that it cannot be sprung off.



*Fig. 3.—Sectional View.*

These machines are described as made from the best material, the wiper and reel blade being of high-grade crucible cast steel and emphasis is laid on their durability. The parts represented in Fig. 3 of the illustrations are as follows: 1, side plate; 2, double-acting adjusting screw; 3, pivot of cutter bar; 4, bolt for roller adjustment; and 5, cutter bar.

**Toy Torpedo Gun.**

Toy Gun Company, Chicago, are putting on the market the toy represented herewith, which is referred to as a miniature model of the well-known Gathmann tor-



*Toy Torpedo Gun.*

pedo gun. The toy gun, unlike the latter, is entirely of wood and is described as harmless, no explosives or powder being used. The torpedo is upheld in its flight by wings, the effect of which is plainly visible, giving to the torpedo its range and

accuracy. It is stated that the torpedo will always hit the target if the latter is within reach and the torpedo properly aimed. In using the gun a circular rod with knob at one end is inserted in the rear end of the device, and over this knob a strong rubber band, which is placed around the axle of the gun, is drawn. The torpedo is then inserted in the gun with the wing side up, after which aim is taken. Pulling the knob back and releasing it causes it to spring forward with considerable force, the rubber band being the propelling power. The torpedo is thus discharged from the gun. In putting up the device the manufacturers furnish four pieces, which upon being set properly together represent an ironclad, which is used as the target. Four bullets also accompany the cannon, together with two long slender torpedoes. The torpedoes are, of course, easily inserted in the gun and are of such length that they project 2 or 3 inches beyond its muzzle. The bullets are loaded into the gun by means of a ramrod. This toy is manufactured in three sizes: No. 1 is 11 inches long, Nos. 2 and 3 being 15 inches long.

#### The Varsity and Vassar Bicycles.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., are putting on the market the two bicycles shown in Figs. 1 and 2 as

Humber pattern, with solid steel links, having rear slot adjustment. The head is 10½ inches long, of seamless steel tubing, with forged steel ball races top and bottom. The forks are made of the best seamless steel tubing, brazed into a forged steel crown. The steel coasters are detachable. The handle bar is of best steel tubing gracefully curved and dropped,

geared to 52 inches, has lace dress shield and gear case. With both machines a tool bag, wrench and oiler are furnished.

#### The Lawrence Coasting Guard.

The accompanying illustrations of a coasting guard illustrate the improved form in which it is offered by the Copeland

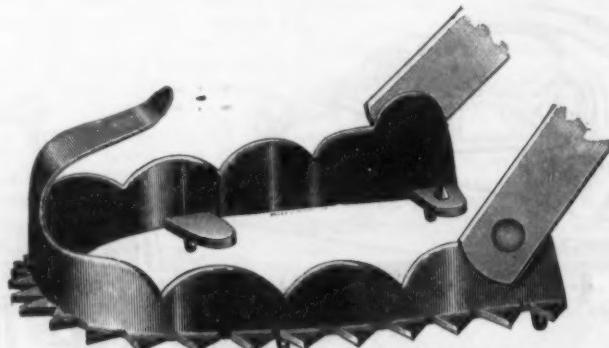


Fig. 1.—The Lawrence Coasting Guard.

with cork handles, direct plunger brake and steel lamp bracket. The saddle is a new scorcher pattern, light and adjustable with a tubular seat rod. Ball bearings are of the best quality, with single adjust-

Hardware Mfg. Company, Worcester, Mass. Fig. 1 shows the device, which is intended to protect the boots and shoes when coasting. It also serves as a brake and steerer when running into danger, as a sled can be readily stopped by pressing the toe into the snow or ice. It is easily



Fig. 1.—The Varsity.

strictly high-grade wheels, made under their own supervision, and for which repairs can be made and new parts furnished without loss of time. The frame of the Varsity is strictly diamond, of the best quality cold drawn steel tubing and steel forgings. The wheels are 30 inches, with

ment, and are furnished to the head, wheels, crank axle and pedals. The machine is geared to 60 inches and weighs 37 pounds. The finish is in fine black enamel with the usual parts heavily nickel-plated on copper and polished. The wheels are fitted with 2-inch pneumatic or 1½ cushion tires.



Fig. 2.—The Vassar.

crescent steel rims, tangent spokes nickel plated to intersection, butt-ended at the hub and fastened by nipples at the rim. A forged steel step is screwed directly on the rear axle. The cranks are of the round, light pattern, of forged steel, with light rattrap pedals. The chain is the light

The Vassar, a ladies' wheel, is similar in general construction and material, but having a frame of the low dropped pattern, constructed entirely of best cold-drawn steel tubing, brazed into steel forgings. The wheels are 28-inch, with light, neat pedals with square rubbers. It is

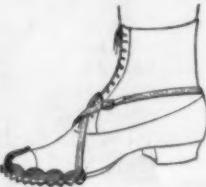
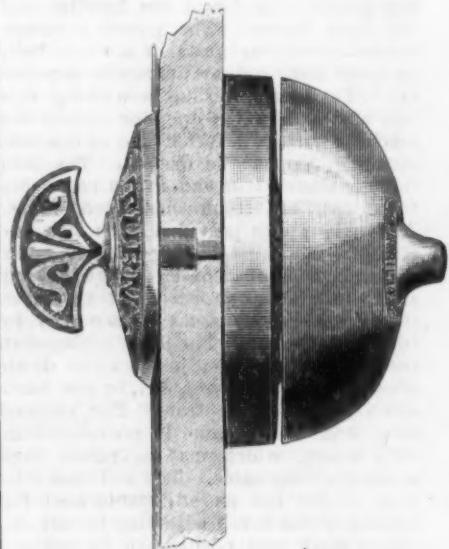


Fig. 2.—The Manner of Attaching the Coasting Guard.

adjusted to the foot, Fig. 2, being made of malleable iron it can be spread or closed to fit a broad or narrow shoe or boot. The point is made that it gives the coaster perfect control over the sled.

#### New Improvement Door Bell.

Hardware Specialty Company, Newark, N. J., have modified the appearance and construction of their New Improvement



New Improvement Door Bell.

door bell, and are now putting it on the market as represented in the accompanying illustration. From an inspection of

the latter it will be observed that the company have done away with the old cumbersome base with the lugs for screws on the outside, being now screwed on from the inside by removing the gong. The frame, also, which was formerly japanned, is now highly polished in nickel, so that the entire bell has a nickel finish. The manufacturers call attention to the beauty and neatness of the bell as thus offered. This door bell requires no winding and has no springs.

#### New Valves of the Crane Company.

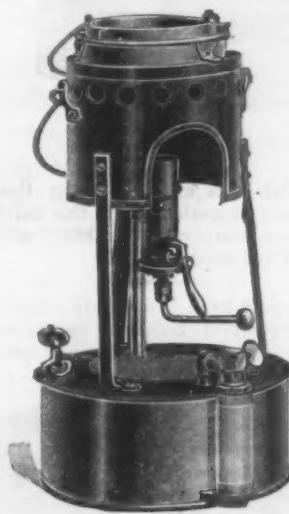
Illustrations are herewith given of two new devices of interest to steam and hot water engineers which have been put on the market by the Crane Company of Chicago. Fig. 1 is a quick-opening radiator valve for hot water, and Fig. 2 is a low-pressure pop safety valve. The manufacturers state that in designing the radiator valve they have carefully considered the effects of expansion and contraction, also the straining of the valve body in making connections. It opens or closes with a half turn, the advantages of which will be fully appreciated. An arrow on the top plate of the handle indicates the position of the valve, viz.: it is open when the arrow points toward the side opening of the valve and closed when it points the opposite way. The construction of the valve is such that there is no obstruction, the full area of the pipe being maintained. When the valve is closed a by-pass in the disk insures continuous circulation, thereby preventing freezing. The wheel is of wood. Five sizes are made, from  $\frac{1}{2}$  inch to 2 inches, with rough body or plated trimmings or plated all over.

The low-pressure pop safety valve, Fig. 2, is made of brass, in five sizes, from  $\frac{1}{2}$

heretofore. The manufacturers make the following statement concerning these valves: "They are simply, thoroughly reliable, and can be set to any desired pressure up to 25 pounds. They will pop every time at the pressure indicated and reseat themselves with a loss of but 1 pound. All valves will be thoroughly tested and the popping pressure plainly stamped on body."

#### Hull's Plumbers' Lead Furnace.

We show in the accompanying cuts views of Hull's 1893 plumbers' lead fur-



*Fig. 1.—Furnace Complete with Furnace and Lead Pot.*

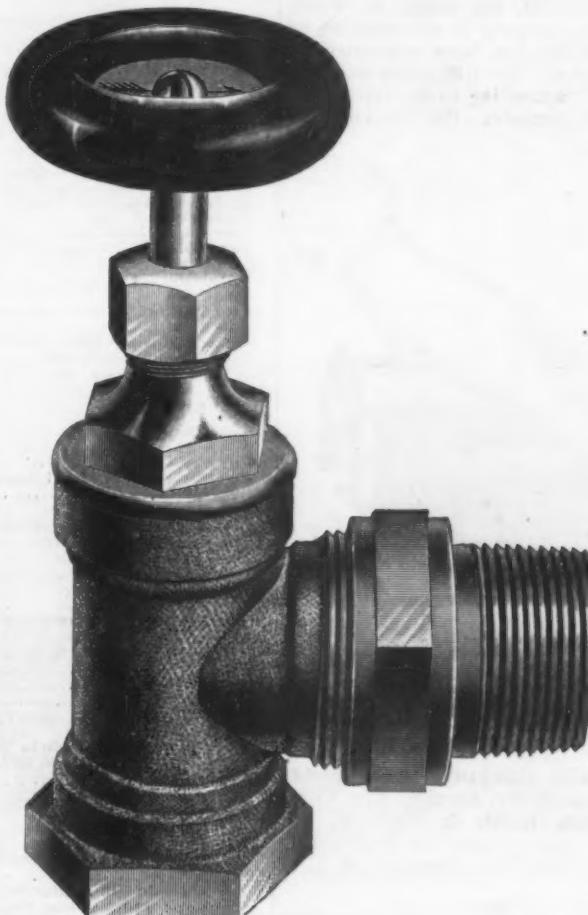
nace, manufactured by M. L. Hull, 24 Broadway, Cleveland, Ohio. Fig. 1 shows the furnace complete with casing and

suspended in the casing. The burner is made of brass with an iron mouthpiece to prevent burning out and is operated by a lever, right and left, instead of a wheel or thumb nut under the burner. A slide cut-off prevents the liquid from streaming out



*Fig. 2.—Furnace Taken Apart as Used for a Torch.*

of the top in starting the fire, and it is said keeps the burner hot with trifling expense between jobs. Furthermore, the gas jet and flame are incased in the burner so they cannot be blown out with the wind. The tank, as described, is very strong, being of galvanized steel, double seamed and riveted, with brass top. The top frame and casing are made of heavy sheet steel. The legs are sprung into catches on top of the tank and require no tools to take off or put on. The casing is suspended with lips on the outer rim and the pot, shown separate in Fig. 2, is suspended inside the casing. The manufacturers point out that there is no grate or bottom to burn out or to break or obstruct the fire. Both casing and pot are provided with guides to bring them into their proper places. The casing, it is said, causes the flame to hug closely around the pot and to quickly melt the lead. If desired, a 6-inch pot that fits over the outer rim can be furnished instead of the smaller pot and casing. The pump is the Hull patent rubber handle, which also serves as a handle when the tank is used as a torch. A few pressures on the handle will, it is said, run the furnace for hours. For heating coppers there is a bar



*Fig. 1.—Quick-Opening Hot-Water Radiator Valve.*

inch to 2 inches. It was designed to meet the demand for a special valve to take the place of the old style ball valves used

lead pot, while Fig. 2 shows it taken apart as used for a torch, the lead pot showing lips and guide from which it is



*Fig. 2.—Low-Pressure Pop Safety Valve.*

inside for the points to rest on when placed over the fire through the top. The manufacturer mentions that with center

opening and rests for coppers this makes an excellent furnace for tinner's use on roofs, as it is wind proof.

#### Stanley's Improved Plane Irons.

What is referred to by the makers as a substantial improvement in the production of plane irons has recently been introduced by the Stanley Rule & Level Company of New Britain, Conn. The construction of the plane iron is said to be

The holder is lined with asbestos which prevents the conduct of heat. All radiation of heat from the iron upward against the hand is prevented by an extra heavy nickel-plated brass shield, which fits closely. In operating the holder, the right hand is placed over the top, with thumb at catch. The catch is then pressed, opening the holder. In adjusting the holder it is placed over the iron so as to fit the iron handle. Both parts of the holder are then pressed together, and it is ready for use. The rapidity with which this is ac-

the value of the new arrangements which are supposed to concern the welfare of all classes. Meanwhile merchants employ whomsoever they please.

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Fig. 1.—Showing Cap Screw in position for using the Iron.

such as to render it unnecessary to detach the cap iron at any time, for the reason that the connecting screw will slide back to the extreme end of the slot in the plane iron without danger of falling out. The screw may then be tightened by means of the thumb and finger, the screw head being properly milled for the purpose. The cap

accomplished is alluded to by the manufacturers, together with the safety, convenience, simplicity, durability and cheapness of the holder.

A report from Waterbury, Conn., states that the several concerns belonging to the newly formed brass consolidation, known



Fig. 2.—Cap Screw in position for Sharpening the Iron without the necessity of removing the Cap.

iron will then serve as a convenient rest or handle in whetting or sharpening the cutting edge of the plane iron. In the accompanying illustrations the construction of these plane irons is so clearly indicated as to call for very little description. Fig. 1 represents a plane iron with the cap screw fastened just back of the circular opening in the slot and in position for using the iron. Fig. 2 shows the cap screw moved to the rear end of the slot and in position for sharpening the iron without the necessity of removing the cap. The manufacturers state that by placing the circular enlargement of the slot nearest the cutting edge the plane iron can be safely tempered up to or beyond the lower edge of the circle, thus insuring equal expansion and contraction of the metal. The owner can also use up his cutter closer than heretofore without the liability of its being broken or cracked at this point.

#### Always Cool Sad-Iron Holder.

J. L. Kesner & Co., Chicago, Ill., are manufacturing the above article, which is

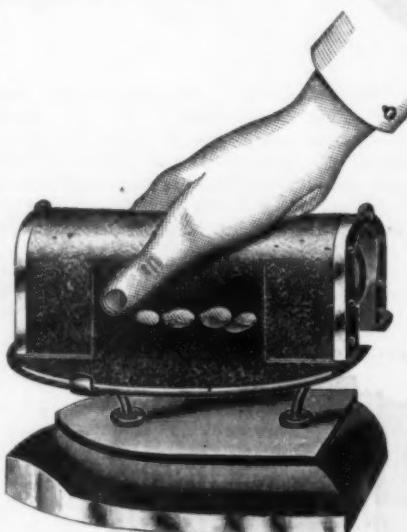


Fig. 2.—Holder in Use.



Fig. 1.—Always Cool Sad-Iron Holder.

illustrated herewith. This holder will fit any regular sad iron or polishing irons of any make, excepting Mrs. Potts' irons.

Burnham Mfg. Company, Plume & Atwood Mfg. Company, Scoville Mfg. Company, Holmes, Booth & Haydens, the Waterbury Brass Company of Waterbury, and the Coe Brass Mfg. Company of Torrington.

Since the labor riots in New Orleans business men there have organized for mutual protection from striking employees, adopting regulations and prescribing penalties, but no events have occurred to test

# Current Hardware Prices.

JANUARY 4, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobber at the figures named.

The character @ is used to indicate a range of price; thus discount 50@10@50@10@5% signifies that the goods in question are sold at prices ranging from discount 50 and 10% to discount 50 and 10 and 5%.

**Adjusters, Blind—**

Domestic..... \$ per doz \$3.00, 33½¢  
Excelsior..... \$ per doz \$10.00, 50¢@10@2½%  
North..... list net @ 10%  
Zimmerman's—See Fasteners, Blind.

**Ammunition—See Caps, Cartridges, Shells, &c.****Anvils—**

Eagle Anvils, F & G..... 15@15@5%  
Peter Wright's..... 11@11½%  
Armitage's Mouse Hole..... 10@11½%  
Am. Wrought, Horse shoe brand..... 11@11½%  
Trenton..... 10@10½%  
Wilkinson's..... 10@11½%  
Moore & Barnes Mfg. Co..... 33½¢

**Anvil Vise and Drill—**

Millers Falls Co., \$18.00..... 20¢  
Cheney Anvil and Vise..... 25¢  
Allen Anvil and Vise \$3.00..... 40@10%  
Star..... 45@25%

**Apple Parers—See Purers, Apple, &c.****Augers and Bits—**

Douglas Mfg. Co.....  
Wm. A. Ives & Co.....  
Humphreysville Mfg. Co..... 75¢  
French, Swift & Co. (F. H. Beecher).....  
P. S. & W. Co.....  
Rockford Bit Company..... 55¢  
Cook's, N. H. Cooper Co..... 60¢  
Ives' Circular Lip..... 60¢  
Patent Solid Head..... 30¢  
C. E. Jennings & Co., No. 10, extension..... 40¢  
C. E. Jennings & Co., No. 30..... 60¢  
C. E. Jennings & Co., Auger Bits, F set, 25¢, quarters, No. 5, \$5; No. 30, \$3.50@25%  
Lewis' Patent Single twist..... 45¢  
Russell Jennings' Augers and Bits 25@10%  
Imitation Jennings' Bits..... 60¢@20@10%  
Pugh's Black..... 20¢  
Pugh's Jennings Pattern..... 30¢  
Car Bits..... 60@60@10%  
Car Bits, P. S. & W. Co..... 60@60@10%  
Snell's Car Bits..... 60¢  
L'Homedieu Car Bits..... 15@10%  
Forstner Pat. Auger Bits..... 90¢  
Cincinnati Bell-Hangers' Bits..... 30@10

**Bit Stock Drills—**

Morse Twist Drills..... 50@10@5%  
Standard..... 50@10@5%  
Cleveland..... 50@10@5%  
Syracuse, for metal..... 50@10@5%  
Syracuse, for wood (wood list)..... 30@30@5%  
Cincinnati, for wood..... 30@10@5%  
Cincinnati, for metal..... 45@10

**Expansive Bits—**

Clark's small, \$18; large, \$26. 35@35@10%  
Ives' No. 4, F per doz \$80..... 40¢  
Swan's..... 40¢  
Steer's, No. 1, \$20; No. 2, \$32..... 35¢  
Stearns' No. 2, \$48..... 20¢

**Gimlet Bits—**

Common..... \$ gross \$2.75@3.25  
Diamond..... \$ per doz \$1.25..... 40@10%  
Bee..... 25@25@5%  
Double Cut, Shepardson's..... 45¢@45@10%  
Double Cut, C. T. Valley Mfg. Co., \$30.10@10%  
Double Cut, Hartwell's, F gross, \$5.00, 25¢  
Double Cut, Douglass'..... 40@10%  
Double Cut, Ives..... (60@60@10%)

**Hollow Augers—**

Ives'..... 33½@33½¢  
French, Swift & Co..... 10%  
Douglass'..... 10%  
Bonney's Adjustable, F per doz \$18..... 50¢  
Stearns'..... 30@10%  
Ives' Expansive, each \$4.50, 50¢@5%  
Universal Expansive, each \$4.50, 20¢  
Wood's..... 25@25@10%  
Cincinnatti Adjustable..... 25@10%  
Cincinnatti Standard..... 25@10%

**Ship Augers and Bits—**

L'Homedieu's..... 15@10@15@10@5%  
Watrous'..... 25@25@10%  
Snell's..... 15@10@15@10@5%  
Snell's Ship Auger Patt'n Car Bits, 15@10@15@10@5%

**Awl Hafts—See Hafts, Awl.****Awls—**

Awls, Sewing, Common..... F gr. 85¢@90¢  
Awls, Should. Peg..... F gr. 50¢@61.5¢  
Awls, Pat. Peg..... F gr. 35¢@38¢  
Awls, Shouldered Brad..... F gr. \$1.30@1.40  
Awls, Handled Brad..... F gr. 2.50@3.00  
Awls, Handled Scratch..... F gr. 84.00@4.50  
Awls, Socket Scratch..... F per doz \$1.10@\$1.20

**Awl and Tool Sets—See Sets, Awl and Tool.****Axes—**

Plain, Beveled.  
First quality, best brands \$7.00 87.50  
First qual., other brands { 6.50 7.00  
Second quality..... 5.50 6.00

**Axle Grease—See Grease, Axle.****Axes—**

No. 1... 34¢@41¢, No. 2, 5¢@6¢  
Nos. 7 to 14..... 6¢@10%  
Nos. 15 to 18..... 47¢@5¢, 3¢ cash  
Nos. 19 to 22..... 70¢  
Concord Axes, loose collar..... 45¢@6¢  
Concord Axes, solid collar..... 5¢@6¢  
National Tubular Self Oiling..... 33¢@34¢@35¢

**Bag Holders—See Holders, Bag.****Balances—**

Spring Balances..... 40¢  
Chatillon, F per doz \$0.80, 95¢ 1.75 net  
Chatillon Straight Balances..... 40¢  
Chatillon Circular Balances..... 50¢@10%

**Barb Wire—See Wire, Barb.****Bars—Crow—**

Cast Steel..... F per doz \$3¢  
Iron, Steel Points..... F per doz \$3¢

**Basins, Wash—**

Standard Fibreware, No. 1, 10½-inch, \$2;  
12-inch, \$2.25 13½-inch, \$2.75; 15-inch,  
\$3.25

**Beams, Scale—**

Scale Beams, List Jan. 12, '92, 50@10%  
Chatillon's No. 1..... 40¢  
Chatillon's No. 2..... 50¢  
Custer's..... 33½¢

**Beaters—Egg—**

Dover..... F per doz \$1.20@1.50  
Duplex (Standard Co.)..... F per doz \$1.25  
Rival (Standard Co.)..... F per doz \$1.00  
Duplex Extra Heavy (Standard Co.).....

Bryant's..... F gross \$14.00  
Double (H. & R. Mfg. Co.)..... F gro. No. 0  
\$12.00; No. 1, \$15.00; No. 2, \$18.00

Easy (H. & R. Mfg. Co.)..... F gro. \$16.50  
Triple (H. & R. Mfg. Co.)..... F gro. \$25@45@50

Improved Acme (H. & R. Mfg. Co.)..... F gro. \$9.00  
Paine, Diehl & Co.'s ..... F gro. \$24.00  
Silver & Co. .... F per doz \$5.50

Keystone, P. D. & Co., Each, No. 1, \$1;  
No. 2, \$2..... 20¢

**Bells—Cow—**

Common Wrought..... 60@10%  
Western, Sargent's list..... 70@10%  
Kentucky, Star..... 70@10%  
Kentucky, Sargent's list..... 70@10%  
Kentucky Durham..... 70@10%  
Dodge, Genuine Kentucky..... 70@10%  
Texas Star..... 60@10@50@10@5%

**Door—**

Gong, Abbe's..... 33½@10%  
Gong, Yankee..... 60@10%  
Gong, Barton's..... 40@10@5%  
Crank, Taylor's..... 25@10%  
Crank, Brooks'..... 50@10@5%  
Crank, Cone's..... 10¢  
Crank, Connel's..... 10@10%  
Lever, Sargent's..... 60@10%  
Lever, Taylor's Bronzed or Plated..... net  
Lever, Taylor's Jpanned..... 25@10%  
Lever, R. & E. Mfg. Co.'s..... 50@10@25%  
Pull, Brook's..... 50@10@25%

**Electric—**

Wollensak's..... 20¢  
Bigelow & Dowse..... 20¢  
Taylor's..... 20¢

**Hand—**

Light Brass..... 70@10@70@10@5%  
Extra Heavy..... 70¢  
White..... 70¢  
Silver Chime..... 33½@10%  
Globe Cone's Patent..... 25@10@35¢

**Miscellaneous—**

Call..... 45@50%  
Farm Bells..... F per doz \$3@3½¢  
Steel Alloy Church and School Bells, 40¢

**Belows—**

Blacksmiths'..... 60@10@50@10@5%  
Molders'..... 40@10@50%  
Hand Belows..... 40@10@50%

**Belting, Rubber—**

Common Standard..... 70@10@75@5%  
Standard..... 70@10@70@10%  
Extra..... 60@10@60@10@5%  
N.Y.B. & P. Co., Carbon..... 90¢  
N.Y.B. & P. Co., Diamond..... 50¢  
N.Y.B. & P. Co., Para..... 40¢

**Bench Stops—See Stops, Bench****Benders and Upsetters, Tire—**

Stoddard's Lightning Tire Upsetters, 15¢  
Detroit Perfected Tire Bender, 15¢

Green River Tire Benders and Upsetters..... 20¢

**Bits—**

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

**Bit Holders—See Holders.****Blind Adjusters—See Adjusters, Blind.****Blind Fasteners—See Fasteners, Blind.****Blind Staples—See Staples, Blind.****Blocks—**

Cleveland Block Co., Malleable Iron, 50@50@10%  
Moore's Novelty, Malleable Iron..... 60¢

Sur Grip Steel Tackle Blocks..... 25¢

**Bolts—****Carriage, Machine, &c.—**

Com. list June 10, '92..... 75@10@50@80%  
Golden Eagle, Norway, list Oct. '94..... 50¢@80¢@10¢

Phila. pattern, list Oct. 7, '92..... 75@10@80@10%

R. B. & W., old list..... 70¢

Machine, list Jan. 1, '90..... 80¢@10%  
Bolt Ends, list Jan. 1, '90..... 80¢@10%

Bolt Heads, list Jan. 1, '90..... 80¢@10%

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**Halters—**

Covert's, Rope, Jute..... 60&10@10&2%  
 Covert's Rope, 7-in., Jute..... 70&2%  
 Covet's Rope, 4-in., Hemp..... 50&2%  
 Covet's Adj. Rope Halters..... 40&2%  
 Covet's Hemp Horse and Cattle Tie..... 50&10&2%  
 Covet's Jute Horse Ties..... 70&2%  
 Covet's Jute Cattle Ties..... 70&10&2%  
 Covet's Adj. Web Halters..... 35&5&2%  
 Covet's Saddlery Works Halters..... 33&4%  
 Covet's Saddlery Works Horse and Cattle Ties..... 33&4%

**Hammers—****Handled Hammers—**

Maydole's, list Dec. 1, '85..... 25&10@35%  
 Buffalo Hammer Co. ....  
 Humason & Beckley..... 50&10%  
 Atha Tool Co. ....  
 Verree.....  
 C. Hammond & Son..... 40&10@-%  
 Fayette R. Plumb.  
 Artisan's Choice, A. E. Nail..... 40&10%  
 Regular Y. P., A. E. Nail..... 50%  
 Horseshoe Turning Hammers..... 50%  
 Other Hammers..... 50&10%  
 Cheney's Claw..... 40&10%  
 Cheney's Machinist's & Riveting..... 50&5%  
 Magnetic Tack, Nos. 1, 2, 3, \$1.25, 1.50 & 1.75..... 30&10%  
 Nelson Tool Works..... 40&10%  
 Warner & Nobles, new list..... 25&10  
 Peck, Stow & Wilcox..... 40&10@50%  
 Sargent's..... 40&40@10%

**Heavy Hammers and Sledges—**

3 lb and under..... \$1.40@ 75&10%  
 3 to 5 lb..... \$1.36@ 75&10%  
 Over 5 lb..... \$1.30@ 75&10%  
 Wilkinson's Smiths..... 104&11&2%  
 Sledge—See Knives.

**Handcuffs and Leg Irons—**

—See Police Goods.  
**Handles—**  
**Cross-Cut Saw Handles—**  
 Atkne's No. 1 Loop, \$pr., 28&4%; No. 3, 18&4%; No. 6, 15&4%; No. 2 and No. 4, Reversible, 18&4%; Champion..... 15%  
 Ely's Perfection..... \$1.00 gro., \$24.00

**Iron, Wrought or Cast—**

Door or Thumb.... 0 1 2 3 4  
 Per doz..... \$0.90 1.00 1.05 1.35 1.50  
 60&10@10%  
 Roggin's Latches..... \$1.00@35%  
 Brown Iron Drop Latches..... \$1.00 net  
 Jap'd Steel Door Handles-Nuts, \$1.00  
 Plate, \$1.10; no plate, \$0.88..... net  
 Barn Door, \$1.40..... 10&10%  
 Chest and Lifting..... 70&70@10%

**Wood—**

Saw and Plane..... 40&10@50%  
 Hammer, Hatchet, Axe, &c. .... 40&40@5%  
 Brad Awl..... \$1 gr 2.00  
 Hickory Firmer Chisel, ass'd. .... \$ gr 4.50  
 Hickory Firmer Chisel, large, \$ gr 5.00  
 Apple Firmer Chisel, ass'd. .... \$ gr 5.00  
 Apple Firmer Chisel, large, \$ gr 6.00  
 Socket Firmer Chisel, ass'd. .... \$ gr 3.00  
 Socket Framing Chisel, ass'd. .... \$ gr 5.00  
 J. B. Smith & Co. Pat File..... 50%  
 File, assorted..... \$ gr 2.75  
 Anger, assorted..... \$ gr 5.00..... 50%  
 Anger, large..... \$ gr 7.00..... 50%  
 Pat. Auger, Ives'..... 30&10%  
 Pat. Auger, Douglass..... \$ set \$1.25  
 Pat. Auger, Swan's..... \$ set \$1.00  
 Hoe, Rake, Shovel, &c. .... 60&60@5%

**Hangers—**

Barn Door, old patterns..... 60&10@10%  
 Barn Door, New England..... 60&10@10%  
 Samson Steel Anti-Friction..... 55%  
 Orleans Steel..... 55%  
 Hamilton Wrought Steel Track..... 55%  
 U. S. Wood Track..... 65%  
 Champion..... 60&10%  
 Rider and Wooster, Medina Mfg. Co.'s list..... 70%  
 Climax Anti-Friction..... 55%  
 Climax Anti-Friction for Wood Track..... 55%  
 Zenith for Wood Track..... 55%  
 Reed's Steel Arm..... 50%  
 Challenge, Barn Door..... 50%  
 Sterling..... 60&50@10%  
 Victor, No. 1, \$15.00; No. 2, \$16.00; No. 3, \$18.00..... 50&2%  
 Cheritree..... 50&10%  
 Kidder's..... 40&10@50%  
 Boss..... 60&10%  
 Best Anti-Friction..... 50&10%  
 Duplex (Wood Track)..... 60&10@2%  
 Terry's Pat., \$10 per pr. in, \$10.00; 5 in. \$12.00..... 50&10%  
 Terry's Steel Anti-Friction Leader..... 50&10%  
 Terry's Steel Anti-Friction Ideal..... 50&10%  
 Cronk's Patent, Steel Covered..... 50&10%  
 Wood Track Iron Clad, \$ ft. 104..... 50%  
 &15@60%  
 Carrier Steel Anti-Friction..... 50&10%  
 Architect, \$ set \$6.00..... 20%  
 Eclipse..... 20&10%  
 Felix, \$ set \$4.50..... 20%  
 Richards'..... 30&30@10%  
 Lane's New Standard..... 50&50@5%  
 Lane's Standard..... 50&50@10%  
 Lane's Parlor..... 40%  
 Ball Bearing Door Hanger 20&10@25&10%  
 Warner's Pat. .... 20&10@20&10@10%  
 Stearns' Anti-Friction 20&10@20&10@10%  
 Stearns' Challenge 20&10@25&10@10%  
 Faultless..... 40&40@5%  
 American, per set \$6.00..... 20&10%  
 Rider & Wooster, No. 1, 62&4%; No. 2, 75&4%; No. 3, 82&4%; No. 4, 88&4%; No. 5, 95&4%; No. 6, 102&4%; No. 7, 109&4%; No. 8, 116&4%; No. 9, 123&4%; No. 10, 130&4%; No. 11, 137&4%; No. 12, 144&4%; No. 13, 151&4%; No. 14, 158&4%; No. 15, 165&4%; No. 16, 172&4%; No. 17, 179&4%; No. 18, 186&4%; No. 19, 193&4%; No. 20, 200&4%; No. 21, 207&4%; No. 22, 214&4%; No. 23, 221&4%; No. 24, 228&4%; No. 25, 235&4%; No. 26, 242&4%; No. 27, 249&4%; No. 28, 256&4%; No. 29, 263&4%; No. 30, 270&4%; No. 31, 277&4%; No. 32, 284&4%; No. 33, 291&4%; No. 34, 298&4%; No. 35, 305&4%; No. 36, 312&4%; No. 37, 319&4%; No. 38, 326&4%; No. 39, 333&4%; No. 40, 340&4%; No. 41, 347&4%; No. 42, 354&4%; No. 43, 361&4%; No. 44, 368&4%; No. 45, 375&4%; No. 46, 382&4%; No. 47, 389&4%; No. 48, 396&4%; No. 49, 403&4%; No. 50, 410&4%; No. 51, 417&4%; No. 52, 424&4%; No. 53, 431&4%; No. 54, 438&4%; No. 55, 445&4%; No. 56, 452&4%; No. 57, 459&4%; No. 58, 466&4%; No. 59, 473&4%; No. 60, 480&4%; No. 61, 487&4%; No. 62, 494&4%; No. 63, 501&4%; No. 64, 508&4%; No. 65, 515&4%; No. 66, 522&4%; No. 67, 529&4%; No. 68, 536&4%; No. 69, 543&4%; No. 70, 550&4%; No. 71, 557&4%; No. 72, 564&4%; No. 73, 571&4%; No. 74, 578&4%; No. 75, 585&4%; No. 76, 592&4%; No. 77, 599&4%; No. 78, 606&4%; No. 79, 613&4%; No. 80, 620&4%; No. 81, 627&4%; No. 82, 634&4%; No. 83, 641&4%; No. 84, 648&4%; No. 85, 655&4%; No. 86, 662&4%; No. 87, 669&4%; No. 88, 676&4%; No. 89, 683&4%; No. 90, 690&4%; No. 91, 697&4%; No. 92, 704&4%; No. 93, 711&4%; No. 94, 718&4%; No. 95, 725&4%; No. 96, 732&4%; No. 97, 739&4%; No. 98, 746&4%; No. 99, 753&4%; No. 100, 760&4%; No. 101, 767&4%; No. 102, 774&4%; No. 103, 781&4%; No. 104, 788&4%; No. 105, 795&4%; No. 106, 802&4%; No. 107, 809&4%; No. 108, 816&4%; No. 109, 823&4%; No. 110, 830&4%; No. 111, 837&4%; No. 112, 844&4%; No. 113, 851&4%; No. 114, 858&4%; No. 115, 865&4%; No. 116, 872&4%; No. 117, 879&4%; No. 118, 886&4%; No. 119, 893&4%; No. 120, 900&4%; No. 121, 907&4%; No. 122, 914&4%; No. 123, 921&4%; No. 124, 928&4%; No. 125, 935&4%; No. 126, 942&4%; No. 127, 949&4%; No. 128, 956&4%; No. 129, 963&4%; No. 130, 970&4%; No. 131, 977&4%; No. 132, 984&4%; No. 133, 991&4%; No. 134, 998&4%; No. 135, 1005&4%; No. 136, 1012&4%; No. 137, 1019&4%; No. 138, 1026&4%; No. 139, 1033&4%; No. 140, 1040&4%; No. 141, 1047&4%; No. 142, 1054&4%; No. 143, 1061&4%; No. 144, 1068&4%; No. 145, 1075&4%; No. 146, 1082&4%; No. 147, 1089&4%; No. 148, 1096&4%; No. 149, 1103&4%; No. 150, 1110&4%; No. 151, 1117&4%; No. 152, 1124&4%; No. 153, 1131&4%; No. 154, 1138&4%; No. 155, 1145&4%; No. 156, 1152&4%; No. 157, 1159&4%; No. 158, 1166&4%; No. 159, 1173&4%; No. 160, 1180&4%; No. 161, 1187&4%; No. 162, 1194&4%; No. 163, 1201&4%; No. 164, 1208&4%; No. 165, 1215&4%; No. 166, 1222&4%; No. 167, 1229&4%; No. 168, 1236&4%; No. 169, 1243&4%; No. 170, 1250&4%; No. 171, 1257&4%; No. 172, 1264&4%; No. 173, 1271&4%; No. 174, 1278&4%; No. 175, 1285&4%; No. 176, 1292&4%; No. 177, 1299&4%; No. 178, 1306&4%; No. 179, 1313&4%; No. 180, 1320&4%; No. 181, 1327&4%; No. 182, 1334&4%; No. 183, 1341&4%; No. 184, 1348&4%; No. 185, 1355&4%; No. 186, 1362&4%; No. 187, 1369&4%; No. 188, 1376&4%; No. 189, 1383&4%; No. 190, 1390&4%; No. 191, 1397&4%; No. 192, 1404&4%; No. 193, 1411&4%; No. 194, 1418&4%; No. 195, 1425&4%; No. 196, 1432&4%; No. 197, 1439&4%; No. 198, 1446&4%; No. 199, 1453&4%; No. 200, 1460&4%; No. 201, 1467&4%; No. 202, 1474&4%; No. 203, 1481&4%; No. 204, 1488&4%; No. 205, 1495&4%; No. 206, 1502&4%; No. 207, 1509&4%; No. 208, 1516&4%; No. 209, 1523&4%; No. 210, 1530&4%; No. 211, 1537&4%; No. 212, 1544&4%; No. 213, 1551&4%; No. 214, 1558&4%; No. 215, 1565&4%; No. 216, 1572&4%; No. 217, 1579&4%; No. 218, 1586&4%; No. 219, 1593&4%; No. 220, 1600&4%; No. 221, 1607&4%; No. 222, 1614&4%; No. 223, 1621&4%; No. 224, 1628&4%; No. 225, 1635&4%; No. 226, 1642&4%; No. 227, 1649&4%; No. 228, 1656&4%; No. 229, 1663&4%; No. 230, 1670&4%; No. 231, 1677&4%; No. 232, 1684&4%; No. 233, 1691&4%; No. 234, 1698&4%; No. 235, 1705&4%; No. 236, 1712&4%; No. 237, 1719&4%; No. 238, 1726&4%; No. 239, 1733&4%; No. 240, 1740&4%; No. 241, 1747&4%; No. 242, 1754&4%; No. 243, 1761&4%; No. 244, 1768&4%; No. 245, 1775&4%; No. 246, 1782&4%; No. 247, 1789&4%; No. 248, 1796&4%; No. 249, 1803&4%; No. 250, 1810&4%; No. 251, 1817&4%; No. 252, 1824&4%; No. 253, 1831&4%; No. 254, 1838&4%; No. 255, 1845&4%; No. 256, 1852&4%; No. 257, 1859&4%; No. 258, 1866&4%; No. 259, 1873&4%; No. 260, 1880&4%; No. 261, 1887&4%; No. 262, 1894&4%; No. 263, 1901&4%; No. 264, 1908&4%; No. 265, 1915&4%; No. 266, 1922&4%; No. 267, 1929&4%; No. 268, 1936&4%; No. 269, 1943&4%; No. 270, 1950&4%; No. 271, 1957&4%; No. 272, 1964&4%; No. 273, 1971&4%; No. 274, 1978&4%; No. 275, 1985&4%; No. 276, 1992&4%; No. 277, 2000&4%; No. 278, 2007&4%; No. 279, 2014&4%; No. 280, 2021&4%; No. 281, 2028&4%; No. 282, 2035&4%; No. 283, 2042&4%; No. 284, 2049&4%; No. 285, 2056&4%; No. 286, 2063&4%; No. 287, 2070&4%; No. 288, 2077&4%; No. 289, 2084&4%; No. 290, 2091&4%; No. 291, 2098&4%; No. 292, 2105&4%; No. 293, 2112&4%; No. 294, 2119&4%; No. 295, 2126&4%; No. 296, 2133&4%; No. 297, 2140&4%; No. 298, 2147&4%; No. 299, 2154&4%; No. 300, 2161&4%; No. 301, 2168&4%; No. 302, 2175&4%; No. 303, 2182&4%; No. 304, 2189&4%; No. 305, 2196&4%; No. 306, 2203&4%; No. 307, 2210&4%; No. 308, 2217&4%; No. 309, 2224&4%; No. 310, 2231&4%; No. 311, 2238&4%; No. 312, 2245&4%; No. 313, 2252&4%; No. 314, 2259&4%; No. 315, 2266&4%; No. 316, 2273&4%; No. 317, 2280&4%; No. 318, 2287&4%; No. 319, 2294&4%; No. 320, 2301&4%; No. 321, 2308&4%; No. 322, 2315&4%; No. 323, 2322&4%; No. 324, 2329&4%; No. 325, 2336&4%; No. 326, 2343&4%; No. 327, 2350&4%; No. 328, 2357&4%; No. 329, 2364&4%; No. 330, 2371&4%; No. 331, 2378&4%; No. 332, 2385&4%; No. 333, 2392&4%; No. 334, 2399&4%; No. 335, 2406&4%; No. 336, 2413&4%; No. 337, 2420&4%; No. 338, 2427&4%; No. 339, 2434&4%; No. 340, 2441&4%; No. 341, 2448&4%; No. 342, 2455&4%; No. 343, 2462&4%; No. 344, 2469&4%; No. 345, 2476&4%; No. 346, 2483&4%; No. 347, 2490&4%; No. 348, 2497&4%; No. 349, 2504&4%; No. 350, 2511&4%; No. 351, 2518&4%; No. 352, 2525&4%; No. 353, 2532&4%; No. 354, 2539&4%; No. 355, 2546&4%; No. 356, 2553&4%; No. 357, 2560&4%; No. 358, 2567&4%; No. 359, 2574&4%; No. 360, 2581&4%; No. 361, 2588&4%; No. 362, 2595&4%; No. 363, 2602&4%; No. 364, 2609&4%; No. 365, 2616&4%; No. 366, 2623&4%; No. 367, 2630&4%; No. 368, 2637&4%; No. 369, 2644&4%; No. 370, 2651&4%; No. 371, 2658&4%; No. 372, 2665&4%; No. 373, 2672&4%; No. 374, 2679&4%; No. 375, 2686&4%; No. 376, 2693&4%; No. 377, 2700&4%; No. 378, 2707&4%; No. 379, 2714&4%; No. 380, 2721&4%; No. 381, 2728&4%; No. 382, 2735&4%; No. 383, 2742&4%; No. 384, 2749&4%; No. 385, 2756&4%; No. 386, 2763&4%; No. 387, 2770&4%; No. 388, 2777&4%; No. 389, 2784&4%; No. 390, 2791&4%; No. 391, 2798&4%; No. 392, 2805&4%; No. 393, 2812&4%; No. 394, 2819&4%; No. 395, 2826&4%; No. 396, 2833&4%; No. 397, 2840&4%; No. 398, 2847&4%; No. 399, 2854&4%; No. 400, 2861&4%; No. 401, 2868&4%; No. 402, 2875&4%; No. 403, 2882&4%; No. 404, 2889&4%; No. 405, 2896&4%; No. 406, 2903&4%; No. 407, 2910&4%; No. 408, 2917&4%; No. 409, 2924&4%; No. 410, 2931&4%; No. 411, 2938&4%; No. 412, 2945&4%; No. 413, 2952&4%; No. 414, 2959&4%; No. 415, 2966&4%; No. 416, 2973&4%; No. 417, 2980&4%; No. 418, 2987&4%; No. 419, 2994&4%; No. 420, 3001&4%; No. 421, 3008&4%; No. 422, 3015&4%; No. 423, 3022&4%; No. 424, 3029&4%; No. 425, 3036&4%; No. 426, 3043&4%; No. 427, 3050&4%; No. 428, 3057&4%; No. 429, 3064&4%; No. 430, 3071&4%; No. 431, 3078&4%; No. 432, 3085&4%; No. 433, 3092&4%; No. 434, 3099&4%; No. 435, 3106&4%; No. 436, 3113&4%; No. 437, 3120&4%; No. 438, 3127&4%; No. 439, 3134&4%; No. 440, 3141&4%; No. 441, 3148&4%; No. 442, 3155&4%; No. 443, 3162&4%; No. 444, 3169&4%; No. 445, 3176&4%; No. 446, 3183&4%; No. 447, 3190&4%; No. 448, 3197&4%; No. 449, 3204&4%; No. 450, 3211&4%; No. 451, 3218&4%; No. 452, 3225&4%; No. 453, 3232&4%; No. 454, 3239&4%; No. 455, 3246&4%; No. 456, 3253&4%; No. 457, 3260&4%; No. 458, 3267&4%; No. 459, 3274&4%; No. 460, 3281&4%; No. 461, 3288&4%; No. 462, 3295&4%; No. 463, 3302&4%; No. 464, 3309&4%; No. 465, 3316&4%; No. 466, 3323&4%; No. 467, 3330&4%; No. 468, 3337&4%; No. 469, 3344&4%; No. 470, 3351&4%; No. 471, 3358&4%; No. 472, 3365&4%; No. 473, 3372&4%; No. 474, 3379&4%; No. 475, 3386&4%; No. 476, 3393&4%; No. 477, 3400&4%; No. 478, 3407&4%; No. 479, 3414&4%; No. 480, 3421&4%; No. 481, 3428&4%; No. 482, 3435&4%; No. 483, 3442&4%; No. 484, 3449&4%; No. 485, 3456&4%; No. 486, 3463&4%; No. 487, 3470&4%; No. 488, 3477&4%; No. 489, 3484&4%; No. 490, 3491&4%; No. 491, 3498&4%; No. 492, 3505&4%; No. 493, 3512&4%; No. 494, 3519&4%; No. 495, 3526&4%; No. 496, 3533&4%; No. 497, 3540&4%; No. 498, 3547&4%; No. 499, 3554&4%; No. 500, 3561&4%; No. 501, 3568&4%; No. 502, 3575&4%; No. 503, 3582&4%; No. 504, 3589&4%; No. 505, 3596&4%; No. 506, 3603&4%; No. 507, 3610&4%; No. 508, 3617&4%; No. 509,

**Brittan, Graham & Mathes, list Jan. 1890.** .60&10&10%  
**Perkins' Burglar Proof.** .60&25%  
**Plate.** .55&60%  
**Barnes Mfg. Co.** .40&40%  
**Yale.** net prices  
**Delta.** .50%  
**L. & C. H. Ward Key Latches.** .50&10%  
**L. & C. Viat Key Latches.** .55&10%  
**Roman's Night Latches.** .15%  
**Brooklyn Latches.** .50&10%  
**Shepardson or U. S.** .25%  
**Seed's N. Y. Hasp Lock.** .25%

**Padlocks—**

**List June 10, 1891.** .50&2%  
**Norwich Lock Mfg. Co., old list.** .50&2%  
**Yale Lock Mfg. Co.** net prices  
**Eagle.** .40%  
**Eureka, Eagle Lock Co.** .40&2%  
**Romer's No. 0 to 91.** .40%  
**Romer's Scandinavian, &c., Nos. 100 to 506.** .15%  
**A. E. Deltz.** .40%  
**Champion Padlocks.** .40%  
**Hotchkiss.** .30%  
**Star.** .00%  
**Horseshoe.** .40%  
**Barnes Mfg. Co.** .40&40%  
**Nock's.** .30%  
**Brown's Pat.** .25%  
**Scandinavian.** .50&20%  
**E. T. Frank's Keystone Scandinavian.** .50&10%  
**Nos. 119, 120, 130 and 140.** .50&10%  
**Other Nos.** .05%  
**Arrow Swords, up to No. 150.** .40%  
**Ames Sword Co. above No. 150.** .50%  
**Slaymaker, Barry & Co.**  
 No. 1010 line. .85&5%  
 No. 41 line. .45&10%  
 No. 61 line. .50&5%  
 No. 21 line. .75%

**Sash, &c.—**

**Clark's No. 1, \$10; No. 2, \$8 per gr.** .33&4%  
**Ferguson's.** .33&1%  
**Victor.** .60&10&2%  
**Walker's.** .10%  
**Attwell Mfg. Co.** .25&33&1%  
**Reading.** .60&10&6% to 10&10%  
**Hammond's Window Springs.** .40%  
**Common Sense, Jap'd, Cop'd and Br'sed.** .50%  
**Common Sense, Nickel Plated.** .50%  
**Universal.** .30%  
**Kempahall's Gravity.** .60%  
**Kempahall's Model.** .60&6&10%  
**Corbin's Daisy, list Feb. 15, 1886.** .70%  
**Payson's Perfect.** .60&10&2%  
**Hugunin's New Wash Balances.** .25&54&2%  
**Hugunin's New Wash Locks.** .25&54&2%  
**Stoddard's Practical.** .10%  
**Ives' Patent.** .60&10 to .60&10&2%  
**Fish (Litchfield's), No. 100, \$ per gr.** .50%  
 No. 105, \$ per gr. .50%  
**Davis, Brown, Barnes Mfg. Co.** .70%  
**Opposition Safety, list January, 1890.** .40%  
**Security.** .70%  
**Giant, list Jan., 1892.** .70&2%  
**Wolcott's.** .60&10&5%  
**Monarch.** .50%

**Lumber Tools—****See Tools, Lumber.****Lustre—**

**Four-ounce bottles.** .40%  
**gross.** .17.00

**Machines.****Boring—**

**Without Augers.** Upright, Angular.  
**Douglas.** .55 to .60. .75... .50%  
**Snell's, Rice's Pat.** .55 to .75. .40&10&10%  
**Jennings'.** .55 to .65. .45&10%  
**Other Machines.** .25 to .27%  
**Phillips' Patent with Augur.** .700. .750... .25%

**Miller's Falls.**

.750... .25%

**Fluting—**

**Knox, 4½-inch Rolls.** .325 each  
**Knox, 6-inch Rolls.** .360 each  
**Eagle, 3½-inch Rolls.** .35%  
**Eagle, 5½-inch Rolls.** .35%  
**Crown, 4½ in.** .35 to .40; .8 in., .35%  
**Crown Jewel, 6 in.** .35 to .40 each  
**American, 6 in.** .35 to .40; 7 in., .35%  
**Domestic Fluter.** .each, .35%  
**Geneva Hand Fluter, White Metal.** .each, .35%  
**Domestic Fluter.** .each, .35%  
**Crown Hand Fluter, Nos. 1, \$15.00; 2,** .35%  
**\$12.50; 3, \$10.00.** .30%  
**Shepard Hand Fluter, No. 25, per doz.** .40%  
**Shepard Hand Fluter, No. 110, \$ per doz.** .40%  
**Shepard Hand Fluter No. 95, \$ per doz.** .38%  
**Clark's Hand Fluter, \$ per doz \$15.00.** .35%  
**Combined Fluter and Sad Iron.** .40%  
**Fair, and Square.** .40%  
**Buffalo, \$ per doz \$10.00.** .10%

**Hoisting—**

**Moore's Hand Hoist, with Lock Brake.** .20%  
**Moore's Differential Pulley Block.** .40%  
**Energy's Mfg. Co.'s.** .25%  
**Bure Grip Steel Tackle Blocks.** .25%

**Washing—**

**Anthony Wayne.** \$ per doz, No. 1, \$1; No. 2, \$1.50; No. 3, \$2.  
**Western Star.** \$ per doz, No. 2, \$4.50; No. 2, \$4.50.  
**Weisells.** .40%  
**Fair, and Square.** .40%  
**Standard Fiberware, No. 1, peck 4.** .40%  
**dozen, \$1; ½-peck, \$3.50.**

**Meat Cutters—****See Cutters, Meat.**

**Mattocks—** Regular list. .60&10 to .60&10&5%

**Measures—** Standard Fiberware, No. 1, peck 4.

**Menders, Harness—**

Per doz. .82.00

**Mills—****Coffee—**

Box and Side, List Jan. 1, 1888. .60 to .60&10%

Net prices are often made which are lower than above discount.

American, Enterprise Mfg. Co. .50¢

The Swift, Lane Bros. .30¢

**Mincing Knives—**

See Knives, Mincing.

**Molasses Gates—**

See Gates, Molasses.

**Money Drawers—**

See Drawers, Money.

**Mowers, Lawn—**

Philadelphia. .60&10&10%  
 Pennsylvania and Continental. .60%  
 New Model and Excelsior. .60 to .60&10%  
 Other Machines. .60&10 to .60&10&75%

**Muzzles—**

Safety. .40%  
**Small sizes.** .40%  
**Large sizes.** .40%  
**Silver & Co. (Covered).** .40%

**Nails—**

Cut and Wire. See Trade Report.

Wire Nails, Papered.

Association list, May 1, 1882. .80 to 10&10%

Cast Mfrs.' list. .70&5 to 70&10%

Hungarian, Finishing, &c. See Tacks.

**Horse—**

Nos. 6 7 8 9 10  
 American. .84 84 84 84 84... .net

Auslable. .28 26 25 24 23... .40&5&2&2%

Clinton, Fin. 19¢ 17¢ 16¢ 15¢ 14¢... .30&10%

Essex. .28¢ 26¢ 25¢ 24¢ 23¢... .40&10&5&5%

Lyra. .10¢ 17¢ 16¢ 15¢ 14¢... .40&10%

Snowden. .19¢ 17¢ 16¢ 15¢ 14¢... .40&10%

Vulcan. .23¢ 21¢ 20¢ 19¢ 18¢... .20%

Northwest. .26¢ 23¢ 22¢ 21¢ 20¢... .25&5&5%

A. C. .25¢ 23¢ 22¢ 21¢ 20¢... .25&10&5&2&5%

C. B. K. .25¢ 23¢ 22¢ 21¢ 20¢... .25&10&5&2&5%

Maud S. .25¢ 23¢ 22¢ 21¢ 20¢... .40&10&5%

Champlain. .28¢ 26¢ 25¢ 24¢ 23¢... .40&5&2&2%

Saranac. .23¢ 21¢ 20¢ 19¢ 18¢... .40&5&2%

Champion. .25¢ 23¢ 22¢ 21¢ 20¢... .10&10&10%

Capewell. .19¢ 18¢ 17¢ 16¢ 15¢... .10&2&10%

Anchor. .23¢ 21¢ 20¢ 19¢ 18¢... .30%

Western. .23¢ 21¢ 20¢ 19¢ 18¢... .30%

Empire Bronzed. .13¢ 11¢ 9¢ 8¢ 7¢... .40%

**Picture—**

Brass Head, Sargent's list. .60 to .60&10%

Brass Head, Combination list. .50&10%

Porcelain Head, Sargent's list. .50&10 to 10&10%

Porcelain Head, Combination list. .40&10 to 10&10%

Niles' Patent. .40%

**Nail Pullers—** See Pullers, Nail.

**Nail Sets—** See Sets, Nail.

**Nut Crackers—**

See Crackers, Nut.

**Nuts—** List Dec. 18, 1889.

Square, Hex. .54¢ 54¢ 54¢ 54¢ 54¢... .60 to 10&10%

Hot Pressed. .54¢ 54¢ 54¢ 54¢ 54¢... .60 to 10&10%

Cold Punched. .54¢ 54¢ 54¢ 54¢ 54¢... .54¢ 54¢ 54¢ 54¢ 54¢... .60 to 10&10%

In packages of 100 lb., add 1-10¢ per lb.; in packages less than 100 lb., add ½¢ per lb.

**Oakum—**

Best or Government. .5¢ 6¢ 7¢ 8¢ 9¢... .60 to 10&10%

U. S. Navy. .5¢ 6¢ 7¢ 8¢ 9¢... .5¢ 6¢ 7¢ 8¢ 9¢... .60 to 10&10%

Navy. .5¢ 6¢ 7¢ 8¢ 9¢... .5¢ 6¢ 7¢ 8¢ 9¢... .5¢ 6¢ 7¢ 8¢ 9¢... .60 to 10&10%

**Oilers—**

Zinc and Tin. .65 to 10&10% to 10&10%

Brass and Copper. .50 to 10 to 10&10% to 10&10%

Malleable, Hammered, Improved, No. 1, .65¢; No. 2, \$1.00; No. 3, \$1.40; No. 4, \$1.80... .10&10% to 10&10%

Malleable, Hammers' Old Pattern, same list. .45¢

Prior's Pat. or "Paragon" Zinc. .60 to 10&10%

Oilstead's Tin and Zinc. .60 to 10&10%

Oilstead's Brass and Copper. .60 to 10&10%

Broughton's Zinc. .60 to 10&10%

Broughton's Brass. .60 to 10&10%

Gem, P. D. & Co. .60 to 10&10%

Steel, Draper & Williams. .60 to 10&10%

**Openers, Can—**

Messenger's Comet. .7¢ per doz \$3.00 to 25¢

American. .7¢ per doz \$2.75 to \$3.00 to 25¢

Duplex. .7¢ per doz \$2.50 to \$2.75 to 25¢

Lyman's. .7¢ per doz \$2.75 to 25¢

No. 4, French. .7¢ per doz \$2.25 to \$2.50 to 25¢

No. 5, Iron Handle. .7¢ per doz \$2.00 to \$2.50 to 25¢

Eureka. .7¢ per doz \$2.50 to 25¢

Sardine Scissors. .7¢ per doz \$2.75 to \$3.00 to 25¢

Star. .7¢ per doz \$2.75 to 25¢

Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50; 60¢ to 70¢ to 75¢

Excelsior, No. 1, \$2.00; 2, \$2.25; 3, \$2.50; 60¢ to 70¢ to 75¢

World's Best. .7¢ per doz \$2.00 to 25¢

No. 2, \$2.40; No. 3, \$2.60... .50¢ to 10&10%

Universal. .7¢ per doz \$2.00... .55¢ to 10&10%

Domestic. .7¢ per doz \$2.00... .45¢

Champion. .7¢ per doz \$2.00... .60¢

**Packing, Steam—**

Rubber—

Standard. .70 to 70 to 10%  
 Extra. .60 to 60 to 10%  
 N. Y. B. & P. Co., Standard. .60 to 60 to 10%  
 N. Y. B. & P. Co., Empire. .60 to 60 to 10%  
 N. Y. B. & P. Co., Salamander. .25 to 25 to 10%  
 Jenkins' Standard. .7¢ per doz. .25 to 25 to 10%

**Miscellaneous—**

American Packing. .10¢ to 11¢ per lb.

Russia Packing. .14¢ to 14¢ per lb.

Italian Packing. .13¢ to 14¢ per lb.

Cotton Packing. .15¢ to 17¢ per lb.

Jute. .7¢ to 8¢ per lb.

**Pails—**

Galvanized—

Quarts. .10 to 12 to 14

Hill's Light Weight, 7¢ per doz \$2.75 to 3.00 to 3.25

Hill's Heavy Weight, 7¢ per doz \$3.00 to 3.25 to 3.75

Helwig's. .25 to 27 to 3.00

Sidney Shepard & Co. .25 to 28 to 3.00 to 3.05

Iron Clad. .25 to 27 to 3.00 to 3.05

Fire Buckets. .25 to 27 to 3.00 to 3.05

Buckets—See Well Buckets.

**Indurated Fiber Ware—**

Quarts. .10 to 12 to 14

Stable and Milk. .14 lb. .40¢ to 45¢

Fire Pails, deep. .40¢ to 45¢

Fire Pails, round bottom. .40¢ to 47.5¢

**Standard Fiber Ware—**

Plain, Deord'.

Water Pails, 7¢ per doz \$4.00 to 4.50

Dairy Pails. .4.50 to 5.00

Fire Pails. .4.50 to 5.00

Sugar Pails. .6.00 to 6.50

Horse Pails. .5.00 to 5.50

Buggy Pails. .4.00 to 4.50

Slop Jars (bal. trap). .8.00 to 9.00

Chamber Pails, 14 qt. .6.50 to 7.50

**Pans—**

Dripping—

Small sizes. .7¢ per doz \$1.40 to 1.60

Large sizes. .7¢ per doz \$1.40 to 1.60

Silver & Co. (Covered). .40¢ to 45¢



**Snaps Harness &c.**

Anchor (T. & S. Mfg. Co.)	65¢
Fitch's (Bristol)	50¢ 10%
Hotchkiss	10%
Andrews	50¢
Sargent's Patent Guarded	70¢ 10¢ 10%
German, new list	40¢ 10%
Covert	50¢ 10¢ 10%
Covert, New Patent	50¢ 10¢ 10%
Covert, New R. E.	60¢ 10¢ 10%
Covered Spring	60¢ 10¢ 10%
Covered's Saddlery Works' Triumph	33¢ 10%

**Snaths, Scythe-**

List. 50¢ 5¢ 5%

**Soldering Irons-**

See Irons, Soldering.

**Splittoons, Cupidors, &c.****Standard Fiberware-**

Cupidors, 8½-in., \$ per doz.	No. 5, \$8 ; No. 5X, \$9.
Splittoons, Daisy, 8-inch, No. 1, 4 ; 10 and 11 inch, \$6.	

**Spoke Shaves-**

See Shaves, Spoke.

**Spoke Trimmers-**

See Trimmers, Spoke.

**Spoons and Forks-****Tinned Iron-**

Basting, Cen. Stamp. Co.'s list	70¢ 10¢
Solid Table and Tea, Cen. Stamp. Co.'s list	70¢ 10¢
Buffalo, S. S. & Co.	33¢ 10¢ 2%

**Silver Plated-**

months or 5% cash 30 days:	
Meriden Brit. Co., Rogers	40¢ 15%
C. Rogers & Bros.	40¢ 15%
Rogers & Bros.	40¢ 15%
Reed & Barton.	40¢ 10¢ 5%
Wm. Rogers Mfg. Co.	40¢ 15%
Simpson, Hall, Miller & Co.	40¢ 15%
Holmes & Edwards Silver Co.	40¢ 15%
L. Boardman & Son.	50¢ 12¢ 2%

**Miscellaneous-**

Holmes & Edwards Silver Co.:	50¢ 10¢ 5%
No. 27 Mexican Silver.	50¢ 10¢ 5%
No. 30 Silver Metal.	50¢ 10¢ 5%
No. 24 German Silver.	50¢ 10¢ 5%
No. 50 Nickel Silver.	50¢ 10¢ 5%
No. 49 Nickel Silver.	50¢ 10¢ 5%

Wm. Rogers Mfg. Co.:	50¢ 10¢ 5%
Bothers' Silver Metal.	50¢ 10¢ 5%
18½ Bothers' German Silver.	60¢ 10%
22½ Bothers' Nickel Silver.	50¢ 8%
German Silver.	50¢ 5%
German Silver, Hall & Elton	50¢ 5% cash
Nickel Silver.	50¢ 5% 10¢ 5% cash
Britannia.	60¢ 5% 10¢ 5% cash
Boardman's Nickel Silver, list July 1, 1891.	60¢ 7½% 12½%
Boardman's Britannia Spoons, case lots.	60¢ 5% cash

Spring-	
Door-	
Torrey's Rod, 39 in.	7¢ doz \$1.20 @ 12½
Gray's, 7¢ gr. \$20.00.	2%
Bed Rod, 7¢ gr. \$20.00.	20¢ 2½%
Warner's No. 1, 7¢ doz \$1.50, No. 2, \$3.40.	50¢ 10%
Gem (Coll.), list April 19, 1886.	10¢ 15%
Star (Coll.), list April 19, 1886.	20¢ 20%
Victor (Coll.).	60¢ 10% 10¢ 5% 10%
Champion (Coll.).	60¢ 10% 10¢ 5% 10%
Cowell's, No. 1, 7¢ doz \$1.00, No. 2, \$15.00.	50¢ 5% 10%
Berber, complete, 7¢ doz \$4.50.	55¢ 10%
Hercules.	50¢ 10% 10%

Carriage, Wagon, &c.-	
Elliptic, Concord, Platform and Half Scroll.	60¢ 10% 10%
Cliff's Bolster Springs.	25¢

Squares-	
Steel and Iron.	85¢ 85¢ 85%
Micke-Plated.	85¢ 85¢ 85%

Try Square and T Bevels.	60¢ 10% 10%
Diaston's Try Square and T Bevels.	50¢
Winterbottom's Try and Miter.	30¢ 10%
Starrett's Micrometer Calliper Squares.	25¢

Avery's Flush Bevel Squares.	40¢
Avery's Bevel Protractor.	50¢

Squeezers-	
Fodder-	
Blair's.	7¢ doz \$2.00

Blair's "Climax".	7¢ doz \$1.25
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Lemon-	
Thompson Mfg. Co.	30¢

Tacks, Brads, &c.-	
Steel and Iron.	85¢ 85¢ 85%
Micke-Plated.	85¢ 85¢ 85%

Try Square and T Bevels.	60¢ 10% 10%
Diaston's Try Square and T Bevels.	50¢
Winterbottom's Try and Miter.	30¢ 10%
Starrett's Micrometer Calliper Squares.	25¢

Avery's Flush Bevel Squares.	40¢
Avery's Bevel Protractor.	50¢

Squeezers-	
Fodder-	
Blair's.	7¢ doz \$2.00

Wood, No. 2.	7¢ doz \$3.00
Wood, Common.	7¢ doz \$7.00 15¢ 75¢
Dunlap's Improved.	7¢ doz \$3.75, 20¢
Sammis', No. 1, \$5.00; No. 2, \$9.12.	
\$18 7¢ doz	25¢ 10%

Jennings' Star.	7¢ doz \$2.50
The Boss.	7¢ doz \$2.50
Dean's, Nos. 1, 7¢ doz \$6.50; No. 2, \$3.35; 3.	50¢ 5% 10%
\$1.90; Queen, \$2.50	
Little Giant.	50¢ 5% 10%

Hotchkiss Straight Flash.	7¢ doz \$12.00
Silver & Co., Glass.	7¢ gro. \$9.00
Manny Lemon Juice Extractor:	
Standard.	7¢ doz \$0.75 @ \$1.00
Improved.	7¢ doz \$2.00

Standard Fiber Ware-	
See Ware, Standard Fiber.	

Staples-	
Blind-	
Barbed, ½ in. and larger.	7¢ 7½¢ 7½¢
Barbed, ¾ in.	7¢ 8¢ 8½¢
Fence Staples, Galvanized.	Same price as Brb Wire
Fence Staples Plain.	See Trd. Rep.

Steelyards	40¢ 10% 5%
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Stocks and Dies-	
Blacksmith's.	
Waterford Goods.	35¢
Butterfield's Goods.	35¢
Lightning Screw Plate.	25¢ 30¢
Reece's New Screw Plates.	25¢ 30¢
Reversible Ratchet.	30¢
Gardener.	25¢
Green River.	25¢ 30¢

Stops, Bench-	
Morrill's.	7¢ doz \$9. 50¢ 10¢ 10%
Hotchkiss's.	7¢ doz \$5. 10¢ 10¢ 10%
Weston's, No. 1, \$10.	2¢ 25¢ 25¢ 25¢
McGill's.	7¢ doz \$3. 10¢ 10%
Cincinnati.	25¢ 10%
Terrell's Nos. 1 and 2.	7¢ doz \$3. 10¢ 10%
Brake.	7¢ doz \$3. 10¢ 10%

Wire Carpet Nails.	7¢ doz \$3. 10¢ 10%
Plywood Rock Steel Carpet Tacks.	25¢ 25¢
Upholsterers' Nails.	40¢ 20¢

Wire Brads and Nails-	
Steel-Wire Brads, R. & E. Mfg. Co.'s list	50¢ 10%
Chesterman's, Regular list.	25¢ 30¢

Scythe Stones-	
Pike Mfg. Co., list April, 1892.	33¢ 10%
Cleveland Stone Co., list Nov. 1892.	33¢ 10%
Scythe Stones, Grind—See Grindstone.	
Scythe Stones.	

Oil Stones, &c.-	

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<b>Washers—</b>	
Size hole.....	5-16 36 36 % to 1%
Washers.....	5 1/4 4 1/2 3 1/2 2 1/2
In lots less than 200 b. # b., add 3¢, 5-16 boxes 1¢ to list.	
<b>Washer Cutters—</b>	
See Cutters, Washers.	
<b>Wedges—</b>	
Iron.....	7 1/2 3 1/2
Steel.....	7 1/2 3 1/2
<b>Weights, Sash—</b>	
Solid Eyes.....	# ton \$18.00-\$19.00
<b>Well Buckets, Galvanized—</b>	
See Buckets, Well, Galvanized.	
<b>Wheels, Well—</b>	
5 in., \$2.25; 10 in., \$2.70; 12 in., \$3.25	
<b>Wire and Wire Goods—</b>	
Iron—	
Market, Br. & Ann., Nos. 0 to 18. 75¢@70¢@75¢@10¢@25%	
Cop'd, Nos. 0 to 18. 75¢@25%	
Galv., Nos. 0 to 18.....	Extra 10% often given.
Tin'd, Tin'd List, Nos. 0 to 18.....	70¢@70¢@10%

<b>Stone,</b>	
Br. and Ann'd, Nos. 18	
10 in.....	50¢
Bright and Ann'd Nos. 19 to 26.....	Extra 10% often given.
Br. and Ann'd, Nos. 27 to 36.....	82¢@85¢
Tinned.....	
Tinned Broom Wire, 15 to 21, P. D. 14¢	
Galvanized Fence.....	75¢@70¢@10%
Brass, list Jan. 18, 1884.....	40¢@50¢
Copper, list Jan. 18, 1884.....	40¢@50¢
Specified Wire on Spools.....	50¢
Mallin's Brass and Cop. on Spools.....	50¢
Mallin's Spooled, Tin'd & Annealed.....	80¢@85¢
Tate's Spooled, Cop. and Brass.....	50¢
Cast Steel Wire.....	50¢
Stubs' Steel Wire.....	.06 to .08, 30%
Steel Music Wire, 15 to 30, imported.....	60¢@70¢ P. D.
Wire Cloth Line, see Lines.	
Wire Picture Cord, see Cord.	
Standard list.....	80¢@20¢@85¢

<b>Wire Cloth and Netting—</b>	
Painted Screen Cloth, good quality, # 100 sq. ft., \$1.40	
Galvanized Wire Netting.....	75¢@75¢@10%
<b>Wire, Barb—</b>	
See Trade Report.	
<b>Wire Rope—</b>	See Rope, Wire.
<b>Wrenches—</b>	
American Adjustable.....	40¢
Baxter's Adjustable "S".....	40¢@10¢@50¢
Baxter's Diagonal.....	50¢
Cox's Combination.....	50¢
Cox's "Mechanic".....	80¢@10¢@25¢
Girard Standard.....	55¢@10¢@25¢
Lamson & Sessions' Engineers'.....	50¢@10¢
Lamson & Sessions' Standard.....	70¢@10¢
P. S. & W. Agricultural.....	75¢@10¢@25¢
Girard Agricultural.....	75¢@10¢@25¢
Lamson & Sessions' Agric'l.....	75¢@10¢@25¢
Benn's & Call's:	
Pat. Combination.....	40¢
Merrick's Pattern.....	35¢
Briggs' Pattern.....	25¢
Cylinder or Gas Pipe.....	40¢@5¢
No. 3 Pipe.....	50¢

Aiken's Pocket (Bright).....	\$0.00, 50¢@10¢
The Favorite Pocket.....	# doz., \$1.00, 40¢
Weber's Pat. Combination.....	25¢
Boardman's.....	25¢@25¢
Always Ready.....	50¢
Alligator.....	50¢
Donohoe's Engineer.....	20¢@10¢
Acme, Bright.....	50¢@25¢
Acme, Nickled.....	40¢@25¢
Hercules.....	70¢@70¢@25¢
Walker's.....	55¢@25¢
Diamond Steel.....	55¢@25¢
Cincinnati Brace Wrenches.....	25¢@10¢
Taft's Vise Wrench.....	55¢@10¢@25¢
<b>Wringers, Clothes—</b>	
Am. Wringer Co.'s list, July 1, '92. 2¢ cash	
Colby Wringer Co., list Sept. 1, '91. 2¢ cash	
Lovell Mfg. Co., list Jan. 1, 1892. 2¢ cash	
Peerless Mfg. Co., list Feb. 1890. 2¢ cash	
National Wringer & Mfg. Co., list	
June 1, 1892. .... 2¢ cash	

**Wrought Goods—**Staples, Hooks, &c., list March 17, 1892. 1  
85¢@10¢@85¢@20¢

## Paints, Oils and Colors.—Wholesale Prices.

**Animal and Vegetable Oils—**

Linseed, City, raw, per gal. ....	48
Linseed, City, boiled.....	51
Linseed, Western, raw.....	48
Lard, City, Extra Winter.....	98
Lard, City, Prime.....	87
Lard, City, Extra No. 1.....	60
Lard, City, No. 1.....	45
Lard, Western, prime.....	87
Cotton-seed, Crude, prime.....	43
Cotton-seed, Crude, off grades.....	40
Cotton-seed, Summer Yellow, prime.....	46
Cotton-seed, Summer Yellow, off grades.....	40
Sperm, Crude.....	72
Sperm, Natural Spring.....	68
Sperm, Bleached Spring.....	73
Sperm, Natural Winter.....	74
Sperm, Bleached Winter.....	78
Whale, Crude.....	43
Whale, Natural Winter.....	52
Whale, Bleached Winter.....	55
Whale, Extra Bleached.....	57
Sea Elephant, Bleached Winter.....	58
Menhaden, Crude, Sound.....	34
Menhaden, Crude, Southern.....	36
Menhaden, Light Pressed.....	37
Menhaden, Bleached W'ter.....	43
Menhaden, Extra Bleached.....	45
Tallow, City, prime.....	50
Tallow, Western, prime.....	45
Cocoanut, Ceylon.....	5 1/2
Cocoanut, Cochin.....	6
Cod, Domestic.....	38
Cod, Foreign.....	42
Red Elaine.....	34
Red Saponified.....	56
Bank.....	per gal. 36
Straits.....	37
Olive, Italian, bbls.....	63
Neatfoot, prime.....	50
Palm, prime, Lagos.....	54

**Mineral Oils—**

Black, 29 gravity, 25 @ 30 cold test.....	per gal. 7
Black, 29 gravity, 15 cold test.....	7 1/2
Black, 29 gravity, summer.....	6
Cylinder, light, filtered.....	14

**Paints and Colors—**

Cylinder, dark, filtered.....	10
Paraffine, 23 1/2 @ 24 gravity.....	11 1/2
Paraffine, 25 gravity.....	10 1/2
Paraffine, 28 gravity.....	8
Paraffine, red.....	9
<b>Cylinder, dark, filtered.....</b>	<b>10</b>
<b>Paraffine, 23 1/2 @ 24 gravity.....</b>	<b>11 1/2</b>
<b>Paraffine, 25 gravity.....</b>	<b>10 1/2</b>
<b>Paraffine, 28 gravity.....</b>	<b>8</b>
<b>Paraffine, red.....</b>	<b>9</b>
<b>TERMS, &amp;c.—Lead and Litharge.—On</b>	<b>lots of 500 lb. or over, 60 days' time</b>
<b>lots of 500 lb. or over, 60 days' time</b>	<b>% discount for cash if paid within 15 days</b>
<b>Ocher, Rochelle.....</b>	<b>1.35</b>
<b>Ocher, French Washed.....</b>	<b>1.15</b>
<b>Ocher, German Washed.....</b>	<b>1.15</b>
<b>Ocher, American.....</b>	<b>1.15</b>
<b>Orange Mineral, English.....</b>	<b>84¢</b>
<b>Orange Mineral, French.....</b>	<b>10</b>
<b>Orange Mineral, German.....</b>	<b>84¢</b>
<b>Paris White, English Cliff stone.....</b>	<b>1.00</b>
<b>Paris White, American.....</b>	<b>65</b>
<b>Red, Indian, English.....</b>	<b>54¢</b>
<b>Red, Indian, American.....</b>	<b>2</b>
<b>Red, Turkey.....</b>	<b>9</b>
<b>Red, Tuscan.....</b>	<b>11</b>
<b>Red, Venetian, American.....</b>	<b>1.00</b>
<b>Red, Venetian, English.....</b>	<b>1.20</b>
<b>Sienna, Italian, Burnt and Raw, Powdered.....</b>	<b>4</b>
<b>Sienna, Italian, Burnt Lumps.....</b>	<b>1.15</b>
<b>Sienna, Italian, Raw, Powdered.....</b>	<b>1.15</b>
<b>Sienna, Italian, Raw, Lumps.....</b>	<b>1.15</b>
<b>Sienna, American, Raw and Burnt and Powdered.....</b>	<b>1.15</b>
<b>Umbre, Turkey, Burnt and Raw, and Powdered.....</b>	<b>3 1/2</b>
<b>Umbre, Turkey, Burnt, Lumps.....</b>	<b>2 1/2</b>
<b>Talc, French.....</b>	<b>1.15</b>
<b>Talc, American.....</b>	<b>1.15</b>
<b>Terra Alba, Fr'ch. # 100.....</b>	<b>95</b>
<b>Terra Alba, English.....</b>	<b>70</b>
<b>Terra Alba, American No. 1.....</b>	<b>65</b>
<b>Terra Alba, American No. 2.....</b>	<b>45</b>
<b>Umber, Turkey, Burnt and Raw, and Powdered.....</b>	<b>3 1/2</b>
<b>Umber, Turkey, Burnt, Lumps.....</b>	<b>2 1/2</b>
<b>Umber, Turkey, Raw and Powdered.....</b>	<b>3 1/2</b>
<b>Umber, Turkey, R'w Lumps.....</b>	<b>2 1/2</b>
<b>Umber, Turkey, R'w Amer.....</b>	<b>1.15</b>
<b>Yellow, Chrome.....</b>	<b>10</b>
<b>Vermilion, American Lead.....</b>	<b>11 1/2</b>
<b>Vermilion, Quicks'r, bulk.....</b>	<b>57</b>
<b>Vermilion, Quicks'r, bags.....</b>	<b>58</b>
<b>Vermilion, Quicksilver sm' pkgs.....</b>	<b>62</b>
<b>Vermilion, English Import.....</b>	<b>85</b>
<b>Vermilion, Imitation, Eng.....</b>	<b>8</b>
<b>Vermilion, Trieste.....</b>	<b>90</b>
<b>Vermilion, Chinese.....</b>	<b>92</b>
<b>Whiting Common, # 100 b. ....</b>	<b>37 1/2</b>
<b>Whiting Gliders.....</b>	<b>45</b>

<b>Zinc, American, dry.....</b>	<b>7 1/2</b>
<b>Zinc, French, Red Seal.....</b>	<b>7 1/2</b>
<b>Zinc, French, Green Seal.....</b>	<b>9</b>
<b>Zinc, French, V. M. X.....</b>	<b>9</b>
<b>Zinc, Antwerp, Red Seal.....</b>	<b>7 1/2</b>
<b>Zinc, Antwerp, Green Seal.....</b>	<b>7 1/2</b>
<b>Zinc, German, L. Z. O.....</b>	<b>6 1/2</b>
<b>Zinc, V. M. In Poppy Oil, G. Seal, lots of 1 ton and over.....</b>	<b>10</b>
<b>Zinc, V. M. In Poppy Oil, Red Seal.....</b>	<b>11</b>
<b>lots of 1 ton and over.....</b>	<b>10</b>
<b>lots of less than one ton.....</b>	<b>11</b>
<b>Discounts to buyers of 10 bbls. lots of one or assorted grades, 1/4; 25 bbls., 2 1/2; 50 bbls. 4%. No discounts allowed on less than bbl. lots.</b>	
<b>Colors in Oil—</b>	
<b>Black, Drop, Frankfort.....</b>	<b>25</b>
<b>Black, Drop, English.....</b>	<b>12</b>
<b>Black, Drop, Domestic.....</b>	<b>7</b>
<b>Black, Lampblack, Best.....</b>	<b>20</b>
<b>Black, Lampblack, Common.....</b>	<b>7</b>
<b>Black, Ivory.....</b>	<b>8</b>
<b>Blue, Chinese.....</b>	<b>35</b>
<b>Blue, Prussian.....</b>	<b>20</b>
<b>Blue, Ultramarine.....</b>	<b>12</b>
<b>Brown, Vandyke.....</b>	<b>7</b>
<b>Green, Chrome.....</b>	<b>3</b>
<b>Green, Paris.....</b>	<b>16</b>
<b>Sienna, Raw.....</b>	<b>7</b>
<b>Sienna, Burnt.....</b>	<b>7</b>
<b>Umber, Raw.....</b>	<b>7</b>
<b>Umber, Burnt.....</b>	<b>7</b>
<b>Putty—</b>	
<b>In barrels and 1/4 bbls.....</b>	<b>.0136</b>
<b>In tubs.....</b>	<b>.0136</b>
<b>In tin cans.....</b>	<b>.0136</b>
<b>In bladders.....</b>	<b>.0136</b>
<b>Spirits Turpentine—</b>	
<b>In regu bbls.....</b>	<b>.3042</b>
<b>In machine bbls.....</b>	<b>.31</b>
<b>Clue—</b>	
<b>Low Grade.....</b>	<b>7 1/2</b>
<b>Cabinet.....</b>	<b>12</b>
<b>Medium White.....</b>	<b>13</b>
<b>Extra White.....</b>	<b>17</b>
<b>French.....</b>	<b>10</b>
<b>English.....</b>	<b>10</b>
<b>Irish.....</b>	<b>12</b>

Have More New Patented Improvements Than Any Other Freezers.

Freeze The Quickest And Run The Easiest.

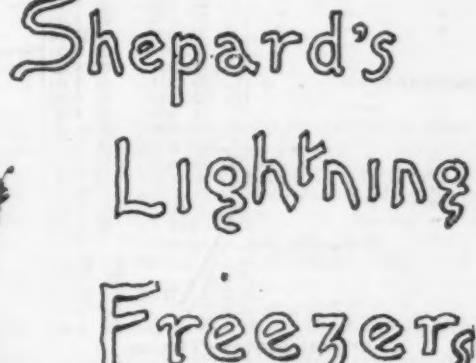
All Inside Parts Tinned

Cedar Tubs

Extra Strong

IT CATCHES THE GIRLS.

Pacific Coast Representatives, CHAS. L. PIERCE & CO., 202 Market St., SAN FRANCISCO, CAL.  
Canadian Representative, H. D. SIMMONS, 74 York St., TORONTO, CNT.



# CURRENT METAL PRICES.

JANUARY 4, 1893.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

## IRON AND STEEL— Bar Iron from Store—

Common Iron:	
1 to 2 in. round and square..	1.90 @ 2.00¢
1 to 6 in. x % to 1 in.....	2.00 @ 2.10¢
Refined Iron:	
1 to 2 in. round and square..	2.00 @ 2.10¢
1 to 4 in. x % to 1 in.....	2.20 @ 2.30¢
4 to 6 in. x % to 1 in.....	2.20 @ 2.30¢
1 to 6 in. x 1/4 and 1-1/2 round and sq. .....	2.10 @ 2.20¢
Rods—1 to 6 x 3-1/2 to No. 12. ....	2.30 @ 2.40¢
Bands—1 to 6 x 3-1/2 to No. 12. ....	2.30 @ 2.40¢
"Burden Best" Iron, base price. ....	3.00¢
Burden's "H. B. & S." Iron, base price.....	2.80¢
"Ulster".....	3.00¢
Norway Bars.....	3.75 @ 4.00¢
Norway Shapes.....	4.50 @ 5.00¢

## Merchant Steel from Store— Per lb

Open-Hearth and Bessemer Machinery, Tire Calk, Tire and Sleigh Shoe, base price in small lots.....	24¢
Best Cast Steel, base price in small lots. ....	8¢
Best Cast Steel Machinery, base price in small lots.....	5¢
American B. B.....	3.00 @ 4.00¢

## Sheet Iron from Store— Black—

Common R. G. Cleaned American. American.	
Nos. 10 to 16.....	2 1/2 @ 3.6¢
17 to 20.....	3 @ 3.6¢
21 to 24.....	3 1/4 @ 3.6¢
25 and 26.....	3 1/2 @ 3.6¢
27.....	3 3/4 @ 3.6¢
28.....	3 5/8 @ 3.6¢
American B. B.....	3.00 @ 4.00¢

## Galvanized Sheet Iron— B. B.

Nos. 10 to 16.....	2 1/2 @ 4.20¢
17 to 22.....	3 @ 4.20¢
23 to 24.....	3 1/4 @ 4.20¢
25 to 28.....	3 1/2 @ 4.20¢
29 to 30.....	3 3/4 @ 4.20¢

Genuine Russia, according to  
assortment.....

Patent Planished.....

Craig Polished Sheet Steel.....

English Steel from Store—  
Best Cast.....

Extra Cast.....

Swaged Cast.....

Best Double Shear.....

Blister, 1st quality.....

German Steel, Best.....

2d quality.....

3d quality.....

Sheet Cast Steel, 1st quality.....

2d quality.....

R. Mushet's "Special".....

" " Annealed.....

" " " Titenic".....

## METALS— Tin—

Per lb	
Banks, Pig.....	22
Straita, Pig.....	21 1/2
Straita in Bars.....	23

## Tin Plates—

Duty: 2.2¢ per lb.

Charcoal Plates—Bright—  
Guaranteed Plates command special prices,  
according to quality.

Melyn and Calland Grade. IC, 10 x 14. @ \$6.50

" " " IC, 12 x 12. @ 6.75

" " " IC, 14 x 20. @ 6.50

" " " IC, 20 x 28. @ 13.00

" " " IX, 10 x 14. @ 6.50

" " " IX, 12 x 12. @ 6.75

" " " IX, 14 x 20. @ 7.50

" " " IX, 20 x 28. @ 15.00

" " " DC, 12 x 17. @ 5.50

" " " DX, 12 x 17. @ 6.00

Allaway Grade.....

IC, 10 x 14. @ 6.00

" " " IC, 12 x 12. @ 6.25

" " " IC, 14 x 20. @ 6.00

" " " IC, 20 x 28. @ 13.00

" " " IX, 10 x 14. @ 6.00

" " " IX, 12 x 12. @ 6.25

" " " IC, 14 x 20. @ 6.00

" " " IC, 20 x 28. @ 13.00

IX, 10 x 14, 14 x 20. ....

IX, 10 x 14, 14 x 20. ....